ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

Building 371/374 Closure Project Decommissioning Operations Plan

Revision 1, Modification 4

May 27, 2004

Reviewed for Classification/UCNI:

By: S. Cunningham

Date: May 27, 2004

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RECORD OF MODIFICATIONS

DOP Modification #	Effective Date	Description
1	4/10/02	Field modification of Section 6.2 to clarify the RCRA closure process for tanks 231A and 231B, the valve vaults and process waste lines
2	5/8/02	Field modification for the addition of RCRA unit 53
3	8/14/02	Field modification for addition of set 59
4	5/27/04	This major modification will incorporate the previous field modifications, provides an alternative decommissioning strategy, which substantially reduces the person-hours required to prepare the facility for demolition, and updates the status of the project.

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ACRONYMS AND ABBREVIATIONS

ACI	American Concrete Institute
ACM	asbestos containing material
AR	Administrative Record
ARARs	applicable or relevant and appropriate requirements
AST	aboveground storage tank
BIO	Basis for Interim Operation
CCR	Code of Colorado Regulations
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHWA	Colorado Hazardous Waste Act
cm	centimeter
CPB	Closure Project Baseline
CSRF	central size reduction facility
CSV	central storage vault
CWTS	Caustic Waste Treatment System
DDCP	Decontamination and Decommissioning Characterization Protocol
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy, Rocky Flats Field Office
DOP	Decommissioning Operations Plan
DOT	U.S. Department of Transportation
dpm	disintegrations per minute
DPP	Decommissioning Program Plan
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
ESH&Q	Environment, Safety, Health & Quality
ES&H	environmental safety and health
FDPM	Facility Disposition Program Manual
FP	filter plenum
FUD	Facility Use Decision
FY	fiscal year
HASP	Health and Safety Plan
HDPE	high-density polyethylene

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HEPA	high efficiency particulate air (filter)
HVAC	heating, ventilation and air conditioning (system)
IA	Industrial Area
IAEA	International Atomic Energy Agency
I/O	in/out (station)
ISMS	Integrated Safety Management System
ISSR	in situ size reduction
ITDC	inner tent demolition chamber
IV	independent verification
IWCP	Integrated Work Control Program
LDR	Land Disposal Restriction
LL	low-level (waste)
LLM	low-level mixed (waste)
LRA	lead regulatory agency
MAA	material access area
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NTS	Nevada Test Site
OSHA	Occupational Safety and Health Act
PA	Protected Area
PCBs	polychlorinated biphenyls
PDS	pre-demolition survey
PDSP	Pre-Demolition Survey Plan
PDSR	Pre-Demolition Survey Report
PMP	Project Management Plan
POD	Plan of the Day
POW	Plan of the Week
PPE	personal protective equipment
Pu	plutonium
PU&D	property use and disposition
PuSPS	Plutonium Stabilization and Packaging System
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFCAB	Rocky Flats Citizens Advisory Board
RFCLOG	Rocky Flats Coalition of Local Governments

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RFETS	Rocky Flats Environmental Technology Site
RISS	Remediation, Industrial Area Decommissioning, and Site Services
RLC	reconnaissance level characterization
RLCP	Reconnaissance Level Characterization Plan
RLCR	Reconnaissance Level Characterization Report
RSOP	RFCA Standard Operating Protocol
SCO	surface-contaminated object
SGS	segmented gamma scanner
SNM	special nuclear material
S/R	stacker retriever
SRA	support regulatory agency
SRS	Savannah River Site
SS&C	sand, slag & crucible
STP	Site Treatment Plan
TBD	to be determined
TPH	total petroleum hydrocarbons
TRM	transuranic mixed (waste)
TRU	transuranic (waste)
TSCA	Toxic Substances Control Act
TSD	treatment, storage, disposal (facility)
UCNI	Uncontrolled Classified Nuclear Information
UST	underground storage tank
WAC	waste acceptance criteria
WIPP	Waste Isolation Pilot Plant
WSRIC	Waste Stream & Residue Identification & Characterization

EXECUTIVE SUMMARY

This revision of the Building 371/374 Closure Project Decommissioning Operation Plan (DOP) provides an alternative decommissioning strategy, which substantially reduces the person-hours required to prepare the facility for demolition. Reducing the person-hours reduces the health and safety risk to the worker. Additionally, Revision 1 updates the DOP for minor modifications 1, 2 and 3 as well as minor corrections and the status of the project. Completed Sets, removed equipment and tanks, and ceased operations have been deleted or noted to depict the remaining scope. The original scope of the project is recorded in the Administrative Record as Building 371/374 Closure Project Decommissioning Operations Plan, Revision 0, March 26, 2001.

The Building 371/374 Closure Project is currently comprised of Buildings 371, 374, 373, 374A, and 7 aboveground storage tanks (ASTs), which are located at Rocky Flats Environmental Technology Site (RFETS or Site). Closure is necessary to meet the goals of the Rocky Flats Cleanup Agreement (RFCA) and the Rocky Flats Closure Project Baseline (CPB).

Building 371/374 was designed and constructed in the 1970s to replace the plutonium pit assembly and pyrochemical operations in Building 776/777, and the residue and waste operations in Building 771/774. Construction was completed in 1980, however, due to deficiencies in the design and construction of its process equipment, Building 371/374 was unable to achieve designed plutonium recovery capabilities. Consequently, plutonium recovery operations in Building 371 were curtailed in 1981. However, waste operations, including material transfer, waste incineration, and laboratory support, continued functioning in Building 371/374.

With suspension of nuclear weapons production operations at the Site in 1989, and subsequent discontinuation of the production mission in 1992, activities within Building 371/374 were re-directed to support the Rocky Flats Vision of safe, accelerated, cost-effective closure. In accordance with the current decommissioning schedule for the Building 371/374 Closure Project, facility components will be decontaminated, size reduced, and removed from the buildings and the buildings will be demolished by June of 2005, at which time environmental restoration (ER) activities will be undertaken to remediate any outstanding issues.

Hazards associated with Building 371/374 operations include radiological and chemical contamination on building surfaces and in building equipment and systems, and physical hazards common to standard industrial environments. Radiological contamination has been found within Buildings 371/374. Contamination is present on building surfaces (e.g., floors and walls) and in equipment and building systems (e.g., gloveboxes, process tanks and ancillary equipment, and ventilation ducts). Some equipment and areas within Building 371/374 have levels of radiological contamination exceeding 2,000 disintegrations per minute (dpm) per square centimeter (cm^2) removable and 50,000 dpm/100 cm^2 fixed plus removable. In addition, radiological hazards are associated with the presence of radioactive and mixed wastes.

The decision to decommission the 371 cluster buildings is the approved action being conducted in accordance with this DOP. An analysis of risks to workers to decontaminate to unrestricted release criteria the Buildings 371 and 374 concrete structure that will remain in the subsurface resulted in a determination that decontamination criteria based upon the risked-based concept in the June 2003, modifications to RFCA Attachment 5 Radionuclide Soil Action Levels should be applied for this DOP. The concrete structure that will remain after demolition that is within 6 feet of the final expected surface grade will meet surface contamination unrestricted release criteria, while concrete below that depth will be decontaminated or removed if it exceeds 7 nCi/g, averaged over just the first 7 inches of the floors and walls.

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The current demolition strategy proposes the use of explosives. Explosives will not be placed in portions of the structure that do not meet the unrestricted release criteria. Additional information on the demolition method, sequence of activities, and quantities and placement strategy for the explosives will be developed as the decommissioning progresses. In accordance with the *RSOP for Facility Disposition*, the use of explosives will be evaluated for its effects on worker health and safety and the environment, and for its cost-effectiveness, as compared to mechanical demolition techniques. Site personnel, the regulatory agencies, stakeholders, and the explosive contractor will be involved in the evaluation process.

For planning purposes, the Building 371/374 Closure Project was divided into small, manageable groupings of similar rooms and equipment referred to as Sets. The *RFETS Reconnaissance Level Characterization Plan (RLCP)* was then used to complete a reconnaissance level characterization (RLC) for each Set.[1] Results were documented in *the Building 371/374 Closure Project Reconnaissance Level Characterization Report (RLCR)*, which identifies the presence of radiological and chemical contamination in and around Building 371/374. Following the RLC, component removal, size reduction, decontamination, and demolition methodologies were examined to complete the development of the decommissioning sequence.

Based upon their review of the RLCR, the U.S. Department of Energy, Rocky Flats Field Office (DOE) and the Colorado Department of Public Health and Environment (CDPHE) concur that Buildings 371 and 374 have significant contamination or hazards and are therefore Type 3 facilities; the vapor effect tanks and exterior of the spray dryer tank are without significant contamination or hazards, but in need of decontamination, and therefore considered Type 2 facilities; and the remaining buildings and tanks are free of contamination and therefore classified as Type 1 facilities.

In accordance with the *RFETS Decommissioning Program Plan (DPP)*, Type 1 facilities may be decommissioned using Site procedures upon notification of the Lead Regulatory Agency (LRA), (i.e., CDPHE) and Type 2 facilities may be decommissioned in accordance with the Site's approved RFCA Standard Operating Protocols (RSOPs) or included with Type 3 buildings in an approved Decommissioning Operations Plan (DOP). Consequently, the scope of this DOP is limited to Building 371/374 and the contaminated tanks.

Decommissioning activities will be planned and executed in accordance with the *RFCA Standard Operating Protocol (RSOP) for Facility Component Removal, Size Reduction, and Decontamination Activities* and the *RSOP for Facility Disposition*. This DOP describes how the RSOPs will be implemented for the Type 3 and Type 2 facilities in the Building 371/374 Closure Project.

[1] Since completion of the RLCR, more detailed planning has been completed for the Building 371/374 Closure Project. As a result, the original Sets have been divided into Dismantlement Sets (i.e., equipment and rooms with removable contamination greater than 2,000 dpm) and Decommissioning Areas (i.e., rooms and equipment with removable contamination less than 2,000 dpm), (see Section 4.3 for details).

1.0 INTRODUCTION

In 1996, DOE, the Environmental Protection Agency (EPA), and CDPHE executed RFCA.[2] RFCA is the Federal Facility Compliance Agreement and Consent Order negotiated pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)[3], the Resource Conservation and Recovery Act (RCRA)[4], and Colorado Hazardous Waste Act (CHWA).[5] RFCA provides the regulatory framework for attaining the goals expressed in the Rocky Flats Vision.[6] The overriding goal for RFETS is to achieve accelerated cleanup and Site closure in a manner that is safe to workers and the public, and protective of the environment.

1.1 Alternatives Analysis and Selection

Three alternatives were evaluated for the near-term and long-term management and ultimate closure of RFETS facilities[7] (i.e., reuse, no action with safe shutdown, and decommissioning). As described in the *RSOP for Facility Disposition*, RFETS facilities will be decommissioned because this alternative supports the goal of safe, accelerated, cost-effective closure, while maintaining long-term protection of public health and the environment. By removing RFETS facilities and associated contamination, risks posed by the Site will be reduced to levels established in the June 3, 2003, modifications to RCRA Attachment 5 Radionuclide Soil Action Levels.

1.1.1 Demolition Process Alternatives Analysis

The original alternatives analysis led to decision to decommission and demolish all buildings in the cluster, this additional alternatives analysis is focused on and related to the Building 371/374 decontamination criteria for the concrete that will remain below the expected surface contour. The Building 371/374 decontamination criteria is being re-evaluated because there is more experience with the decontamination techniques and worker risks posed by these activities, and more information on the contamination profile in Buildings 371/374. This alternatives analysis is only related to Building 371/374, not the entire 371 Closure Project facilities. Two alternatives were considered for the demolition process associated with Building 371 and 374:

- Alternative 1 Decontamination and component removal to unrestricted release criteria followed by demolition of the facility to 3 feet below final proposed grade and backfill and regrading of the project area.

- Alternative 2 Decontamination and component removal consistent with the technical basis of the RFCA modifications for soil remediation followed by demolition of the facility to 3 feet below final proposed grade and backfill and regrading of the project area.

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2 Final Rocky Flats Cleanup Agreement (RFCA), Federal Facility Agreement and Consent Order (CERCLA VIII-96-21, RCRA 3008[h] VIII-96-01, State of Colorado Docket 96-07-19-01), July 19, 1996.

3 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9620 *et seq.*

4 Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments Act (HSWA) and the Federal Facility Compliance Act (FFCAct), 42 USC 6901 *et seq.*

5 Colorado Hazardous Waste Act (CHWA), CRS 25-15-101 *et seq.*

6 The Rocky Flats Vision is contained in Appendix 9 of RFCA.

7 The terms "building" and "facility" are used interchangeably in this DOP.

1.1.1.1 Alternative 1: Decontamination to Unrestricted Release

Under this alternative, the facility would be decontaminated using various techniques including hydrolasing and removal of contaminated concrete. Once the facility had been brought to the unrestricted release criteria, a final survey would be performed to verify the status of the facility. With CDPHE approval of the final survey, the demolition would be initiated and all portions of the structure within 3 feet of the final proposed grade would be removed. The area would be backfilled, the surrounding area would be graded, and vegetation would be established. This alternative was selected and approved in Revision 0 of this DOP

Effectiveness

Effectiveness considers whether the alternative provides protection of public health and the environment. In the short term, there is the potential for adverse impact to water quality, fugitive dust emissions, and transportation of demolition debris. However, potential impacts to water and air are temporary and controllable with mitigation measures.

There would be a potentially adverse impact to worker health and safety because workers would be exposed to industrial hazards associated with decontamination of the concrete. Alternative 1 requires 21,174 additional person-hours for hydrolasing but 2,520 fewer person-hours for demolition complexity, which results in additional 18,654 person-hours in comparison with Alternative 2. The hazards associated with these activities require extensive controls including personal protective equipment, specialized equipment, and work within confined areas. Hazards associated with these activities include:

- Pressurized connections, bodily injury from blade point and flying objects, eye hazards, and noise
- Potential for radiological and chemical exposure and contamination, including wound
- contamination
- Potential spread of contamination and airborne contamination
- Bodily injury from falling objects and equipment, cutting skin/bone, and burns from steam
- Elevated working areas and falls from height

During demolition, there may be the potential of an adverse impact to the public at the Site boundary. There may also be an adverse impact to ecological receptors during demolition because additional areas of the Site would be disturbed. In the long term, this alternative would be effective for overall protection of public health and the environment. ARARs would be achieved.

Implementability

Implementability addresses the technical and administrative feasibility of implementing an alternative and the availability of the services and materials required.

Technical Feasibility
This alternative is technically feasible because there are proven decontamination and removal techniques that would bring the facility to unrestricted release. Currently, an experienced workforce, with specific decontamination experience at RFETS, is in place and has demonstrated through previous performance that it can implement routine decontamination using safe and compliant techniques.

No Endangered Species Act or wetlands concerns are anticipated for this alternative. Permits are not required to implement this alternative.

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Availability of Services and Materials
Standard construction equipment and trained personnel are readily available to implement this alternative. Offsite laboratory testing services exist during the action in the short term; however, the future availability of these facilities cannot be predicted. Post-removal site control would not be required.

Administrative Feasibility
This alternative is administratively feasible because there is no need for coordination with other offices or agencies for permits, easements of right-of ways, or zoning variances. Under this alternative, existing Site management and access controls would be maintained until closure is complete. There would be no need for long-term Site management, access controls or institutional controls. Costs for short-term care, monitoring, controls, and so forth will continue until closure is complete, but would decrease over time.

This alternative is acceptable to the State and local communities; as it was vetted during the formal public comment process during the major modification.

Costs

Evaluation of costs should consider the capital costs to engineer, obtain, and construct the required equipment and facilities, and the operating and maintenance costs associated with the alternative. In accordance with the IGD, cost estimates can be "order-of-magnitude" with sufficient accuracy to allow comparison and ranking of the alternatives.

Capital Cost
The cost to implement either Alternative 1 or Alternative 2 is approximately the same.

Operation and Maintenance
Long-term operation and maintenance costs are expected to be low because the area will be graded and vegetation established in order to provide a stable configuration. Stewardship costs associated with this alternative will be approximately the same as those in Alternative 2.

Present Worth Cost
This analysis was not completed; it is assumed that the alternative would be implemented fairly soon; therefore, today's dollars are a fair estimate.

1.1.1.2 Alternative 2: Decontamination consistent with Modifications to RFCA Attachments, approved June 2003

This alternative applies the risk-based approach to contamination concrete that is expected to remain in the ground in a manner similar to that for subsurface soil as incorporated into the approved June 2003, modifications to RFCA Attachment 5. Under this alternative, the facility would be decontaminated using various techniques including hydrolasing. The facility would be broken into two "zones." The first zone would be from zero to 6 feet below the ground surface, and this zone would be decontaminated or concrete removed to bring the concrete to unrestricted release. The second zone would be 6 feet below the ground surface, and this zone would be decontaminated to bring the concrete to less than 7 nCi/g, determined by averaging the remaining contamination over just the first 7 inches of the floors and walls.

Once the facility preparation was complete as indicated above, a final survey would be performed to verify the status of the facility. With CDPHE approval of the final survey, the demolition would be initiated and all portions of the structure within 3 feet of the final proposed grade would be removed. The area would be backfilled, the surrounding area would be graded, and vegetation would be established. The

differences in the actions taken in Alternative 1 and Alternative 2 are the degree to which the concrete is decontaminated, and the form of final survey that is performed.

Effectiveness

Effectiveness considers whether the alternative provides protection of public health and the environment. In the short term, there is the potential for adverse impact to water quality, fugitive dust emissions, and transportation of demolition debris. However, potential impacts to water and air are temporary and controllable with mitigation measures.

There would be a potentially adverse impact to worker health and safety because workers would be exposed to industrial hazards associated with decontamination of the concrete. Alternative 1 requires 21,174 additional person-hours for hydrolasing, but 2,520 fewer person-hours for demolition complexity, which results in additional 18,654 person-hours in comparison with Alternative 2.

During demolition, there may be the potential of an adverse impact to the public at the Site boundary. There may also be an adverse impact to ecological receptors during demolition because additional areas of the Site would be disturbed. In the long term, this alternative would be effective for overall protection of public health and the environment. ARARs would be achieved.

Implementability

Implementability addresses the technical and administrative feasibility of implementing an alternative and the availability of the services and materials required.

Technical Feasibility
This alternative is technically feasible because there are proven decontamination techniques that would bring the facility to the acceptable contamination levels. Currently, an experienced workforce, with specific decontamination experience at RFETS, is in place and has demonstrated through previous performance that it can implement routine decontamination using safe and compliant techniques.

No Endangered Species Act or wetlands concerns are anticipated for this alternative. Permits are not required to implement this alternative.

Availability of Services and Materials
Standard construction equipment and trained personnel are readily available to implement this alternative. Offsite laboratory testing services exist during the action in the short term; however, the future availability of these facilities cannot be predicted. Post-removal site control would not be required.

Administrative Feasibility
This alternative is administratively feasible because there is no need for coordination with other offices or agencies for permits, easements of right-of ways, or zoning variances. Under this alternative, existing Site management and access controls would be maintained until closure is complete. There would be no need for long-term Site management, access controls or institutional controls. Costs for short-term care, monitoring, controls, and so forth will continue until closure is complete, but would decrease over time.

This alternative is believed to be acceptable to the State and local communities.

Costs

Evaluation of costs should consider the capital costs to engineer, get, and construct the required equipment and facilities, and the operating and maintenance costs associated with the alternative. In accordance with the IGD, cost estimates can be "order-of-magnitude" with sufficient accuracy to allow comparison and ranking of the alternatives.

Capital Cost
The cost to implement either Alternative 1 or Alternative 2 is approximately the same.

Operation and Maintenance
Long-term operation and maintenance costs are expected to be low because the area will be graded and vegetation established in order to provide a stable configuration. Stewardship costs associated with this alternative will be approximately the same as those in Alternative 1.

Present Worth Cost
This analysis was not completed; it is assumed that the alternative would be implemented fairly soon; therefore, today's dollars are a fair estimate.

1.1.1.3 Comparative Analysis of Alternatives

As indicated by the IGD, only alternatives passing the initial screening based on effectiveness, implementability, and cost are compared against each other. Table 1 presents a comparative analysis of alternatives made on a semi-quantitative ranking system based on effectiveness, implementability, and cost. Each category has been scored low (L), medium (M), or high (H). A low score means that the criteria cannot be achieved; a medium score means that the criteria can be achieved most of the time; and a high score means that the criteria will always be achieved or is not required under the alternative. Alternative 2 was selected because it is consistent with Modifications to RFCA Attachments, approved June 2003, the alternative significantly reduces the potential risk to workers and is protective of public health and the environment.

1.2 Scope and Purpose

Decommissioning activities for the Building 371/374 Closure Project will be planned and executed within the scope of the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities* and the *RSOP for Facility Disposition*, which discuss the applicable removal, size reduction, decontamination, and demolition techniques and associated hazards, and outline the measures that will be employed to protect worker health and safety and the environment. The purpose of this DOP is to describe the specific decommissioning activities that will be performed in the Type 3 and Type 2 facilities within Building 371/374 Closure Project (e.g., decontamination and demolition of the central storage vault [CSV]). As determined by the RLC and reported in the *RLCR for the Building 371/374 Cluster*, Buildings 371 and 374 have been identified as Type 3 facilities, and the ASTs that were used to support the aqueous waste treatment system (i.e., Tanks T-802 through T-805) are Type 2 facilities. The remaining facilities are Type 1 facilities and therefore not included within the scope of this DOP

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Table 1 Comparative Analysis of Alternatives[8]

Screening Criteria	Alternative 1 Decontamination to Unrestricted Release	Alternative 2 Decontamination consistent with Modifications to RFCA Attachments, approved June 2003,
Effectiveness		
Protectiveness		
Public health	H	H
Workers	M	H
Environment	H	H
Attains ARARs	H	H
Implementability		
Technical Feasibility		
Construction and operation	H	H
Demonstrated performance	H	H
Adaptable to environmental conditions	H	H
Need for permits	H	H
Availability of Services and Materials		
Equipment	H	H
Personnel and services	H	H
Outside laboratory testing	H	H
Offsite treatment and disposal	H	H
Post-removal site control	H	H
Administrative Feasibility		
Permits required	H	H
Easements of right-of-ways required	H	H
Impact on adjoining property	H	H
Ability to impose institutional controls	H	H
Acceptable to State and local communities	H	M
Costs		
Capital cost	M	M
Operations and maintenance	H	H
Present worth cost	NA	NA

[8] Each category has been scored low (L), medium (M), or high (H). A low score means that the criteria cannot be achieved; a medium score means that the criteria can be achieved most of the time; and a high score means that the criteria will always be achieved or is not required under the alternative.

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2.0 PROJECT ORGANIZATION

This section of the DOP provides a brief description of the Building 371/374 Closure Project organization structure, functions, and interfaces as they pertain to facility management and decommissioning. This information is being supplied to identify reporting relationships and responsibilities. The organizational structure is not an enforceable part of the DOP, and DOE or its contractor may alter the structure without prior notification to or approval of the LRA. Significant organization changes (e.g., management-level changes) will be shared with the LRA as part of the RFCA consultative process.

2.1 Project Team Organization Structure

The Building 371/374 Closure Project will function under an integrated scope, schedule, and cost control system that identifies roles, responsibilities, and interfaces. The project organization is described below, and depicted in Figure 1.

- **Building 371/374 Closure Project Management** – Accountable for the safe planning, execution, and successful completion of the Building 371/374 Closure Project in accordance with applicable standards and requirements.
- **Environment, Safety, Health & Quality (ESH&Q)** – Provides program, policy, and regulatory guidance to Building 371/374 facility management, operations, and project organizations; performs inspections; manages radiological operations; coordinates assessments; collects, tracks, and trends Closure Project ESH&Q metrics; and provides engineering services and planning support to the Closure Project team.
- **Administrative Services** – Assists the Closure Project Manager in resource allocation planning, manages the Building 371/374 Closure Project training program, prepares Closure Project occurrence reports, and provides miscellaneous project administrative support (e.g., document preparation, control, and maintenance).
- **Project Planning, Control, and Resource Allocation** – Manages the Closure Project change control process; monitors and reports Closure Project performance; manages work control, including plan of the day (POD) and plan of the week (POW); administers subcontracts and task orders; and purchases equipment and supplies required to support Closure Project activities.
- **Human Resources** - Provides support in the area of human relations and labor relations, and administer the employee compensation program.
- **Building 371/374 Facility Management** – Operates and maintains Building 371/374 and associated facilities to support Closure Project activities, ensures compliance with the *Building 371/374 Basis for Interim Operation (BIO)*, maintains facility safety category systems (e.g., criticality, fire, ventilation), releases/authorizes work, conducts facility surveillances, maintains facility security, manages facility emergency preparedness, conducts RCRA inspections, and maintains RCRA compliance.

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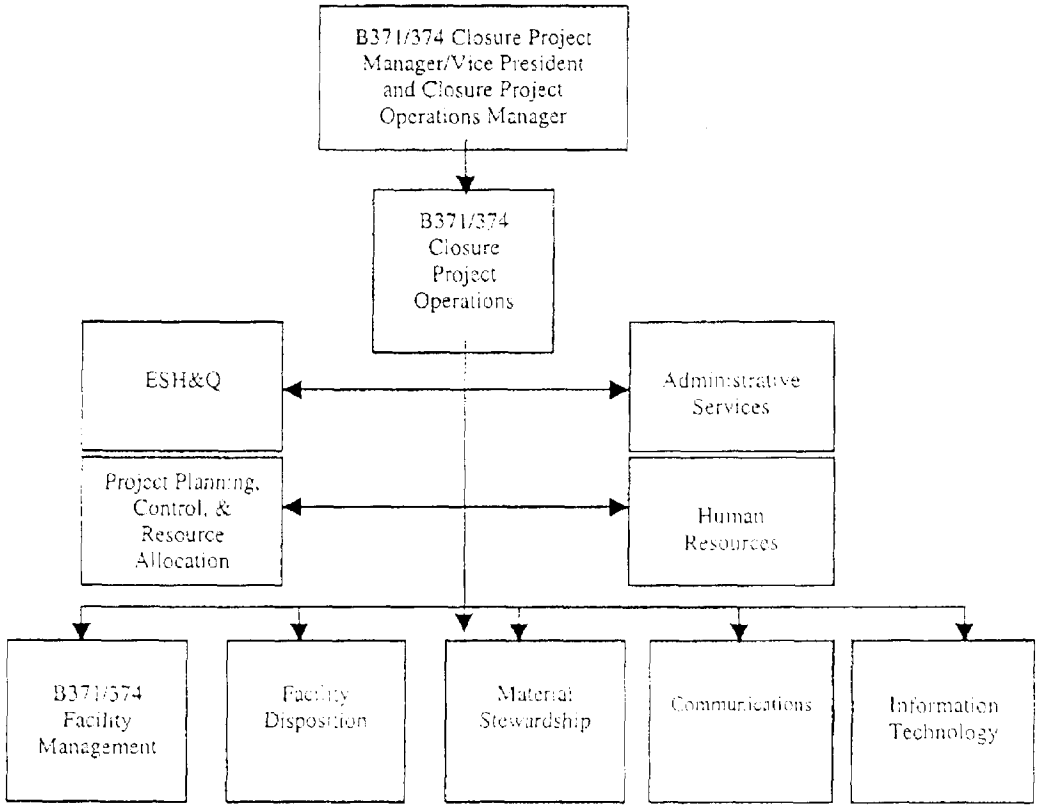

Figure 1. Building 371/374 Closure Project Organization

- **Facility Disposition** – Accountable for the planning and execution of deactivation and decommissioning activities.
  - Planning and Work Package Development: Provides planning, start-up, and technical support for required activities. Functions include routine planning, scheduling, engineering, and operations support (e.g., preparation of Integrated Work Control Program (IWCP) work packages, procedures, and property disposition); closure of the PA; deactivation scheduling and execution; decommissioning planning and execution; and demolition planning and execution. Provides budget and scheduling support, develops data necessary to support the *RFETS 2006 Plan*[9] and the *Building 371/374 Project Management Plan (PMP)*, performs variance analysis, and tracks Closure Project status.
  - Baseline and Deactivation Operations: Responsible for the removal of SNM holdup and "loose" materials, such as combustibles, furniture, and waste chemicals; preparation of gloveboxes for decommissioning; removal of organic liquids from equipment and systems; removal of classified material and tooling; and removal of glovebox line and non-line-generated materials.
  - Technology Transfer & Development: Responsible for researching, developing, and obtaining decontamination and size reduction techniques and equipment.
- **Material Stewardship** – Provides commodities to support Closure Project needs; manages regulated wastes and coordinates inter-building material movements through facility disposition.
- **Communications** – Maintains the Building 371/374 Closure Project website (*http://rfetshp/371/*) and provides Project information to the public and other stakeholders.
- **Information Technology** – Provides computer and data management support to Closure Project management and personnel.

2.2 Project Team Interfaces

As owner of the Site, DOE oversees closure operations, provides input to the contractor regarding funding and overall direction, and communicates with the regulators and other stakeholders (e.g., the Rocky Flats Citizens Advisory Board [RFCAB], the Rocky Flats Coalition of Local Governments [RFCLOG]) regarding the status of the Building 371/374 Closure Project. In addition, DOE is responsible for the enforcement of health and safety provisions of certain federal regulations (e.g., Occupational Safety and Health Act [OSHA] requirements).

CDPHE is the LRA for the Industrial Area (IA). EPA is the support regulatory agency (SRA) in the IA. Therefore, both CDPHE and EPA participate in oversight of decommissioning activities at RFETS. The Defense Nuclear Facilities Safety Board (DNFSB) oversees the storage of source, SNM, and byproduct material and radioactive wastes not subject to CDPHE or EPA regulation. CDPHE, EPA, and the DNFSB have executed a Memorandum of Understanding (MOU) with DOE to define their respective roles and responsibilities for oversight of activities conducted in the IA.[10]

[9] Rocky Flats Environmental Technology Site Closure Project Management Plan (latest revision).

[10] Memorandum of Understanding Governing Regulation and Oversight of Department of Energy Activities in the Rocky Flats Environmental Technology Site Industrial Area, executed February 15, 1996.

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2.3 Working Relationships

The personnel of DOE, its contractor and subcontractors, and the regulators (i.e., CDPHE, EPA) will use the RFCA consultative process described in ¶¶51-61 of RFCA, in Appendix 2 of RFCA, and in Section 1.1.1 of the DPP to establish and maintain effective working relationships with each other and with stakeholders throughout the decommissioning process. To expedite decommissioning activities, the parties have agreed the LRA may participate in the IWCP process to facilitate its exercise of authority under RFCA.[11] For the purposes of the Building 371/374 Closure Project, this means the LRA has an opportunity to discuss issues and ask questions, and to access IWCP-related information for review, but it does not mean the LRA has approval authority for IWCP work packages. DOE and its contractor will advise the LRA of IWCP meetings and roundtable review sessions, and will provide relevant information in a timely manner. The LRA, DOE, and the contractor or subcontractors may use these roundtable review sessions as a forum for RFCA consultation. If this process does not address the LRA's concerns about a particular activity, the LRA may issue a "stop work" order pursuant to RFCA.[12]

[11] The IWCP process is summarized in the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities* and detailed in the RFETS IWCP Manual (MAN-071-IWCP), (latest revision).

[12] See RFCA (¶¶176-180)

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3.0 FACILITY DESCRIPTION

The Building 371/374 Closure Project is comprised of Building 371/374 and associated support structures located within the Site's IA (see Table 2**Error! Reference source not found.**). Figure 2 shows the relative location of these facilities. Facility-specific details are contained in the RLCR. A brief overview of the Type 3 and Type 2 facilities is provided below.

Building 371 (Type 3) was the plutonium recovery facility. It is a four-level structure of reinforced concrete containing approximately 315,022 ft^2 of floor space. The sub-basement (Level 1) consists primarily of the lower part of the CSV and stacker retriever (S/R) maintenance bay. The main basement (Level 2) houses heating, ventilation, and air conditioning (HVAC) equipment and mechanical utilities, as well as the upper part of the CSV and maintenance bay, and small plutonium processing areas. The ground floor (Level 3) contains the majority of the plutonium recovery processing equipment, including tanks and gloveboxes. The attic (Level 4) provides protected space for air distribution systems, chemical piping, electrical conduit, and motor generators. Stairways and an elevator provide access to the various levels and airlock double doors facilitate movement of personnel and material within the building.

Building 374 (Type 3) was the process waste treatment facility. It consists of a main floor, basement, and mezzanine which house tanks for receiving and storing liquid process wastes; a drum handling and storage area; and support equipment, mechanical equipment, and utility areas. The building is a reinforced concrete structure located adjacent to the East Side of Building 371.

Exterior Storage Tanks (Type 2) - Five ASTs that remain have been identified as Type 2 facilities:

- Tanks T-802, T-803, T-804, and T-805 are the 1st through 4th effect vapor body tanks associated with the Building 374 evaporation process. The four tanks are located north of the Building 374 side of Building 371/374 and have a concrete berm, which is constructed of portable concrete road barriers.
- Tank W-803 is the spray dryer tank, located north of the Building 374 side of Building 371/374. The upper part of the tank extends into the mezzanine level of Building 371/374. The tank has a concrete berm and is surrounded by a plywood weather wall.

3.1 Building History

Building 371/374 was constructed in the 1970s to replace the plutonium pit assembly and pyrochemical operations in Building 776/777, and residue and waste operations in Building 771/774. The design was more sophisticated and complex than any other buildings at the Site, emphasizing automatically controlled, remotely operated processes and the ability to withstand design-basis accidents such as earthquakes, tornadoes, winds, and fires. Construction was completed in 1980, at which time process units were available for "cold" system operation testing. DOE authorized "hot" testing in 1981. Due to deficiencies in the design and construction of the process equipment and safety related incidents, as well as the presence of excessive SNM holdup in equipment and piping, DOE directed the Site contractor to curtail plutonium recovery operations in Building 371/374 in 1981. Modifications to Building 371/374 were in process when weapons production operations were terminated at the Site in 1989.

Operations in Building 371/374 focused on the recovery of plutonium from RFETS mission activities (i.e., nuclear weapons parts fabrication, component assembly, and research and development activities) and the treatment of aqueous wastes. Other operations included material storage and transfer, waste incineration, and laboratory support.

Table 2. Facilities Comprising the Building 371/374 Closure Project As of 10/1/03

Facility	Type	Description
Building 371	3	Plutonium recover facility
Building 374	3	Process waste treatment facility
Building 373	1	Pump House
Building 374A	1	Carpentry shops
Tank T-262	1	Petroleum underground storage tank (UST) [a]
Tank T-262A	1	Petroleum AST
Tanks T-802 to T-805	2	Evaporation process vapor body tanks
Tank W 803	2	Spray dryer tank
CT911	1	Cooling Tower
Vendor	1	Nitrogen Tank

a In accordance with Attachment 13 to RFCA, the Site's 20 petroleum USTs have been drained and filled with polyurethane foam. Although soil and groundwater samples from the required site assessment met the 5,000 ppm total petroleum hydrocarbon (TPH) standard, the data will be reviewed during ER to determine whether this information is sufficient to support a decision to close the tanks in place, or whether additional information is required to make this decision. In either case, the petroleum USTs will be disposition under an approved ER decision document

3.2 Current Status

With suspension of nuclear production operations at Rocky Flats in 1989, and the subsequent discontinuation of the production mission in 1992, activities conducted in Building 371/374 have been re-directed to support Site closure, including:

- Storage of plutonium and uranium metal, oxide, residues, transuranic (TRU) waste, transuranic mixed (TRM) waste, LL waste, and LLM waste;
- Completion of mission risk reduction activities, including residue stabilization (i.e., wet combustibles, dry combustibles, ash, fluorides, salts, and sand, slag, and crucible), caustic waste treatment, aqueous waste treatment, and removal of SNM holdup; and
- Completion of deactivation activities in preparation for decommissioning, including shipment of wastes and SNM.

In addition, facility management activities are performed to support day-to-day operations and to ensure compliance with the *Building 371/374 BIO*[13] and other Site requirements, including general housekeeping, routine waste management, maintenance of vital safety systems, laboratory services, records management, inspections, and surveillances.

[13] Rocky Flats Environmental Technology Site, Basis for Interim Operation, Building 371/374 Complex, latest revision.

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3.3 Expected Condition of the Type 3 and Type 2 Facilities at the Beginning of Decommissioning

Details concerning the condition of the buildings within the 371/374 Closure Project are provided in the RLCR. The Type 3 and Type 2 facilities will be decommissioned using a graded approach. As mission activities are completed in each area, deactivation activities will be undertaken to prepare for decommissioning in accordance with this DOP.

Throughout the course of the Building 371/374 Closure Project, the Site's Integrated Safety Management System (ISMS) will be implemented to provide configuration control and minimize the potential for uncontaminated facilities to become contaminated, or decontaminated facilities to be re-contaminated.[14]

[14] ISMS and associated RFETS implementing programs are described in *the RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*.

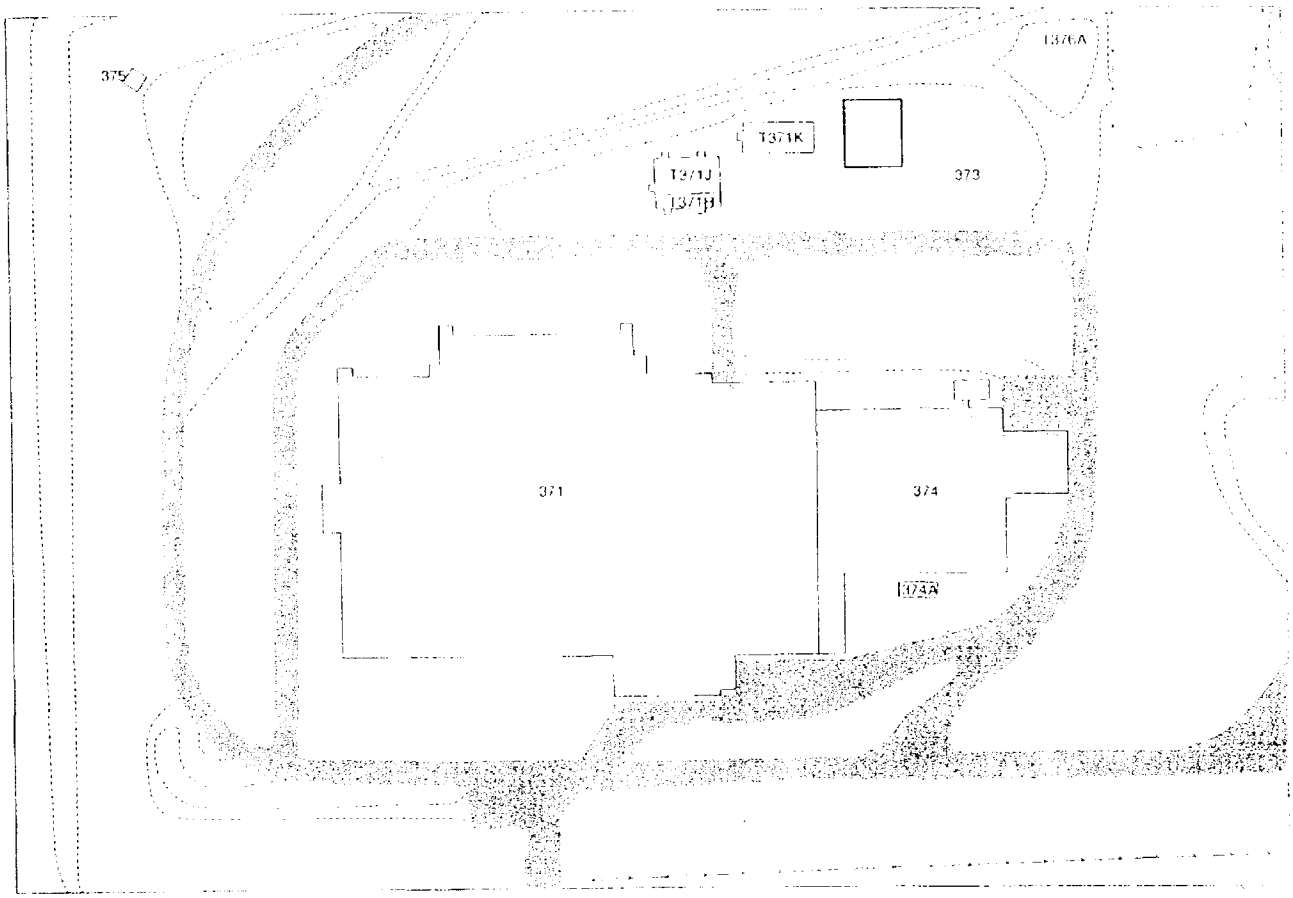

Figure 2. Building 371/374 Closure Project Facilities

4.0 PROJECT APPROACH

The decommissioning planning process for the Building 371/374 Closure Project is under way and the costs and schedules are included in the RFETS CPB. During the course of the Building 371/374 Closure Project, there may be instances where circumstances differ from those predicted. In such cases, planned activities may be revised without revising the CPB, consistent with RFCA and the DPP. Significant changes will be shared with the LRA as part of the RFCA consultative process and, where required, appropriate modifications will be made to the DOP in accordance with RFCA.

4.1 Work Planning and Execution

Decommissioning activities will be planned and executed in accordance with the RFETS ISMS, as described in the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*. Measures employed to protect worker health and safety and the environment are described in *the RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities* and the *RSOP for Facility Disposition*, and discussed in relation to specific activities within the scope of this DOP.

4.2 Building 371/374 Facility Characterization

Facilities within the Building 371/374 Closure Project are being characterized using a four-step approach: scoping characterization, RLC, in-process characterization, and pre-demolition survey (PDS). The following paragraphs describe each step in more detail.

4.2.1 Scoping Characterization

During scoping characterization, existing records and documents were collected, and current and former Building 371/374 employees were interviewed to determine the radiological, chemical, and physical conditions of Building 371/374 and associated support facilities. Based on the information collected, the Building 371/374 Closure Project team proceeded to conduct the RLC in accordance with the requirements of the RFETS RLCP.

4.2.2 Reconnaissance Level Characterization

The purpose of RLC is to provide an initial assessment of the contamination, hazards, and other conditions associated with a facility. The overriding goal of RLC is to answer the following questions:

- What surfaces are suitable for unrestricted release?
- What surfaces will require further decontamination?
- What surfaces will be classified as radiological, hazardous, toxic, or asbestos waste?
- What type of decontamination will be required on specific surfaces?
- How will the surfaces be classified for PDS?
- How will the volumes of waste be classified?
- How will the volumes of waste be disposed?
- What equipment presents a decommissioning hazard?

The RLC included all facilities within the Building 371/374 Closure Project (i.e., Buildings 371, 374, 373, 374A, 377, 378, 381, and the ASTs), except the office building (Building 376) and the office trailers

to the north of Building 371/374. Results are documented in the *RLCR for the Building 371/374 Cluster* and summarized in Table 3. The office building and trailers will be characterized in the same manner at a later time. Based on historical knowledge, they present no radiological, chemical, or unique physical hazards.

Hazards were assessed based on a review of historical and process knowledge, historical radiological and chemical data, and RLC data. Results from the RLC indicate the presence of radioactive contamination within Building 371 and Building 374, and possibly within the vapor effect tanks and the spray dryer. Radioactive contamination is present on surfaces (e.g., floors, walls and equipment) and in equipment and building systems (e.g., gloveboxes, process tanks and lines, and ventilation ducts). Some areas, equipment, and systems have high levels of radioactive contamination. In addition, radiological hazards are associated with the presence of in-process nuclear material, nuclear material holdup, other radioactive materials (e.g., containerized SNM and calibration sources), and radioactive and mixed waste. In addition, some elevated radioactivity was detected on metal roofing, which may be due to naturally occurring radioactive constituents, such as radon decay products. This elevated activity will be investigated further through additional surveys and the collection of physical samples.

Residual amounts of toxic metals, organic solvents, and beryllium are present inside gloveboxes, process equipment, tanks, related piping, and plenums. Some equipment may contain oils contaminated with polychlorinated biphenyls (PCBs). Building 371 also contains considerable amounts of lead shielding, and numerous gloveboxes; equipment and containers are lined with lead. Asbestos-containing material (ACM) is present in most of the buildings in the form of floor and ceiling tile, mastic, and insulation. Some buildings have fluorescent light ballasts containing PCBs. In addition, chemical hazards are associated with in-process nuclear material and hazardous and mixed waste.

Based upon the RLC, and subject to concurrence by the LRA, Buildings 371 and 374 are considered to be Type 3 facilities; Tanks T-802 through T-805 and W-803 are Type 2 facilities; and Buildings 373, 374A, and the remaining tanks are Type 1 facilities.

The Type 1 facilities were characterized in accordance with the requirements for PDS, pursuant to the *RFETS Decontamination & Decommissioning Characterization Protocol (DDCP)*.[15] To ensure these facilities remain free of contamination and the PDS data remain valid, isolation controls have been established, and the facilities posted accordingly. Isolation controls restrict the transfer, storage, and use of radioactive materials. Verification surveys will be performed before the release of these structures to confirm that radioactive material has not been introduced to these areas.

4.2.3 In-Process Characterization

Additional characterization will be conducted during decommissioning, as facility components are removed and building surfaces are further exposed. This type of characterization is referred to as in-process characterization. Data from in-process characterization is used to identify additional hazards; refine approaches to component removal, size reduction, and decontamination; revise waste volume estimates; and modify environmental, safety and health (ES&H) controls, as necessary. In process characterization is also conducted to verify that decontamination activities have achieved the applicable performance specifications, such as release or reuse criteria and waste acceptance criteria (WAC) of the receiving disposal facility. Detailed information regarding the characterization process and associated requirements is contained in the DDCP.

[15] Rocky Flats Environmental Technology Site *Decontamination* and Decommissioning Characterization Protocol (M AN-077 DDCP), latest revision

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Table 3. Summary of Results from the Building 371/374 Reconnaissance Level Characterization Report

Building/ Facility	Chemical Contamination Indicated?	Type of Chemical Contamination	Location	Radiological Contamination Indicated?[c]	Type of Radiological Contamination	Location	Building Classification[a]
B371	Yes	Asbestos[d] Metals, organic solvents, beryllium, and PCBs	Multiple; including roofing material, panels, tiles & insulation As residuals inside gloveboxes, equipment, tanks, piping, and plenums	Yes	Fixed and removable alpha[e]	Extensive; on interior building surfaces, on and in equipment and systems, and on metal roofing	Type 3
B374	Yes	Asbestos[d] Metals, organic solvents, beryllium, and PCBs	Multiple, including roofing material, panels, tiles, and insulation As residuals inside tanks, equipment, and piping	Yes[f]	Fixed and removable alpha[e]	Extensive; on interior building surfaces, on and in equipment and systems, and on metal roofing	Type 3
B373	Yes		piping insulation	No	None found	Not applicable	Type 1
B374A	Yes	Asbestos[d]	Ceiling and floor tile, and insulation	No	None found	Not applicable	Type 1
Tanks, 262, 262A	Yes	Asbestos[d]	Piping insulation	No	None found	Not applicable	Type 1
Tanks, 802-805,W803	Yes	Asbestos[d] Metals, organics, and beryllium	Piping insulation Vapor effect tanks and spray dryer tank	No	None found	Not applicable	Type 2

[a] Per the DPP, Type 3 facilities have significant contamination and/or hazards, Type 2 facilities do not have significant contamination or hazards, but are in need of decontamination, and Type 1 facilities are free of contamination. Building classification does not include environmental media or bulk media beneath the immediate surface of the floors.

[b] Contamination type on roofing to be confirmed; activity may be from naturally occurring radioactive material (i.e., not DOE-added material).

[c] Radiological Engineering recommends surveys where significant configuration changes are implemented in the building before demolition due to unknowns associated with movement of bulk material or equipment.

[d] The presence of asbestos does not make a facility a Type 2 as long as the asbestos is removed pursuant to the Site's asbestos abatement procedures.

Soils underlying Building 371/374 were characterized during 2003 and a NO Further Accelerated Action decision was made on August 21, 2003 by the regulators. The under the building characterization is discussed in Section 4.5.7.

4.2.4 Pre-Demolition Survey

Before facility demolition, a PDS will be conducted to verify the nature and extent of radiological and chemical contamination in the facility. The survey will be conducted in accordance with DDCP. In general, the characterization process will incorporate the following steps:

- The 371/374 Closure Project team will develop characterization packages and take final measurements and samples.
- DOE and the LRA will review the sampling results.
- DOE and/or the LRA will conduct an independent verification (IV) of the characterization data.
- At this time DOE is planning to conduct an IVV.
- The LRA, at its discretion, will review the results from the IV.
- During the characterization process, the LRA will have access to the facilities to collect samples and measurements, at its discretion.

The PDS is intended to verify that the condition of each survey unit meets the requirements for demolition and disposal as provided in this DOP. The PDS is conducted in accordance with the requirements of the *RFETS Pre-Demolition Survey Plan (PDSP)*.[16] The types of data necessary to satisfy the objectives of PDS include total surface contamination measurements, removable surface contamination measurements, and scan data. Given that suspect surface media will be removed during decommissioning, surface media sampling will only be required on a limited basis.

Additional information required to design the PDS includes in-process survey data and updated maps to reflect structural alterations. In-process surveys are performed to assess the changing radiological conditions during the course of decommissioning and to confirm that an area is free of gross contamination. In-process survey data will be incorporated into *the PDS Report (PDSR) for the Building 371/374 Closure Project*.

If isolation controls are maintained throughout the duration of the Project, the PDS will not be repeated for Type 1 facilities. Verification surveys will be performed before the unrestricted release of these structures to confirm that radioactive material was not introduced into these areas. Structures such as administrative support trailers, guard stations and trailers, and auxiliary support trailers are included in this category.

Non-radiological contaminants will be addressed at the in-process characterization phase of decommissioning. In general, non-radiological contaminants will have been removed before the PDS begins and very little, if any, additional sampling will be needed. The non-radiological sampling methodology will be documented in the PDSR.

Based upon available information and data, the following sampling plan is recommended to support the PDS for both radiological and non-radiological constituents:

- Building surfaces will be divided into survey units based on the requirements outlined in the PDSP. The types of measurements that will be performed during PDS include total surface contamination, removable surface contamination, and surface scans.

[16] The RFETS Pre-Demolition Survey Plan is in draft form and currently under going review and approval by the regulators.

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- Surface media samples may also be required on a limited basis.
- An IV survey may be performed on an established percentage of survey units following completion of the PDS. The IV contractor will be selected and funded by the DOE and/or the LRA to ensure independence from Building 371/374 Closure Project personnel.

The areas that have not been decontaminated to the unrestricted release criteria and will remain in place after backfilling will be characterized in accordance with a project-specific characterization package prepared in accordance with DPP, DDCP, PDSP, and the Industrial Area Sampling and Analysis Plan. The objective of this characterization effort is to ensure that the nature and extent of contamination is adequately defined and that the material that will be left in place is consistent with the framework for contaminated soil.

The slab has been characterized using two methods: core analysis and in place gamma spectroscopy. Due to the history of the building, biased locations based on process knowledge were used instead of a grid based characterization approach. Approximately 20 biased and 30 random locations were selected for in place gamma spectroscopy. Additional locations may be selected as required. This information combined with the core analysis completed during the under building sampling; the Modifications to RFCA Attachments, approved June 2003, outlined in Section 4.4.6; and final grade will dictate, which areas require decontamination and which areas can have the contamination fixed and controlled during demolition.

4.3 Dismantlement Sets and Decommissioning Areas

For planning purposes, the Building 371/374 Closure Project has been divided into Dismantlement Sets and Decommissioning Areas. Dismantlement Sets and Decommissioning Areas serve as the foundation for scheduling decommissioning work. Dismantlement Sets consist of small groupings of facility components (e.g., equipment, systems, rooms) containing removable contamination more than 2,000 disintegrations per minute (dpm). Decommissioning Areas are comprised of components with removable contamination less than 2,000 dpm.

For the most part, Dismantlement Sets will be decommissioned by Steelworkers, who will remove, size reduce (if necessary), decontaminate (if necessary), and package highly contaminated process equipment, such as tanks and gloveboxes, but leave in place equipment and systems required for worker safety and convenience (e.g., fire suppression and alarm systems, ambient lighting, domestic water, sanitary drains). Decommissioning Areas will be decommissioned by the Building Trades, who will remove, size reduce (if necessary), and decontaminate (if necessary) any equipment, systems, and contaminated building surfaces remaining after the Dismantlement Sets have been decommissioned.

The Dismantlement Sets for the Building 371/374 Closure Project are presented in Table 4. Table 5 cross-references the current Dismantlement Set and Decommissioning Area numbers to the original Set numbers provided in the RLCR. The Decommissioning Areas are described in Table 6. Due to the close proximity of contaminated process piping and ventilation systems to uncontaminated areas of the building, it is anticipated that Steelworker dismantlement activities may occur in any room of Building 371/374. As a result, Dismantlement Sets have been assigned for all internal areas of Building 371/374.

Although the Set descriptions include removal of equipment, piping, conduit, and ventilation systems, there may be instances where a building component remains in place upon completion of decommissioning activities for a particular Dismantlement Set. In such cases, the Dismantlement Set will be considered complete when:

- The component is left in place because it is necessary for worker safety and/or project coordination.

- The component meets the applicable unrestricted release criteria,
- It will be easier to remove the component as part of a Decommissioning Area, or
- There is no advantage to removing the component.

Table 4. Building 371/374 Dismantlement Sets

Set	Description
6	This Set includes the Oxide and Residue Tank Vaults (Rooms 3563 and 3559), the Ion Exchange Canyons (Rooms 3553, 3549 and Airlock 3551), the Ion Exchange Valve Maintenance Corridor (Rooms 3543, 3545, 3547, 3555, and 3557), and the Access Corridor (Room 3567). This Set involves the removal and packaging of Gloveboxes 58 and 59; Tanks D-49 A/B/C/D, D-50 A/B, D-51 A/B, D-52 A/B, D-55 A/B, D-56, D-57 A/B/C/D, D-59, D-61, D-63 A/B, D-66 A/B, D-68 A/B, D-69 A/B/C, D-72A/B, D-173 A/B, D-191, D-192, and D-305E; Oxide and Residue Ion Exchange Columns T-4 A/B/C, T-5 A/B/C, T-6 A/B/C/D, T-7 A/B/C/D, T-9 A/B, and T-28 A/B/C; and Downdraft Tables DDT-6 and DDT-9. Items internal to the contaminated downdraft tables, gloveboxes, and tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes, tanks, and equipment.
8	This Set includes Rooms 3202, 3204, 3206, and 3208 and involves the removal and packaging of Gloveboxes 39, 40, 41, 42, 43, 44, and 45; 31 pencil tanks; 5 raschig ring tanks; and 1 annular tank. Items internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and tanks.
9	This Set consists of the CSV and associated rooms, including Rooms 1204, 1206, 1218, 1216, 1220, 1224, and I/O Stations 1, 2, 3, 4, 5, 6, and 7. This Set involves removal and packaging of the plutonium storage racks, the primary and spare S/Rs, the stacker transfer vehicle, and the repair lift. Items internal to the contaminated I/O stations will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the I/O stations.
10	This Set includes Rooms 1208, 1210, and 2217 and involves the removal and packaging of the storage vault racks (Room 1208), Scrubbers D-230 A/B, and Tank D-715.
12	This Set includes Rooms 1103, 1105, 1107, 1109, 1111, 1113, 1115, 1117, 1125, 1127, 2319, and 2327, and involves the removal and packaging of Gloveboxes 17, 18, 19, 20, 21, 22, 26, 27, 62, 68, 69, 70, 74, 2401, 2402, 2403, 2404; I/O Station 8; Tanks D-2A/B, D-157A/B, D-160 A/B/C, D-166, D-179, D-189, D-229 A/B, D-233 A/B, D-238A/B, D-40A/B, D-170, D-171, D-293 A/B, D-312, D-400 A/B/C, D-713, D-2401 A/B/C/D, D-2402 A/B, D-2403; Pencil Tanks D-43 A/B, and D-44 A/B; Pumps P-1 A/B, P-2 A/B, P-3 A/B, P-4 A/B, P-7 A/B, P-15A/B, P-27 A/B, P-70 A/B, P-76 A/B, P-82 A/B, P-83 A/B, P-108 A/B, and P-928 A/B; Scrubbers D-131 A/B, T-1, T-10, T-30, and T-31; and Evaporators E-63 A/B, A1 to A-5 and E-70. Control room equipment, conduit, and instrument systems will be removed as part of this Set. Items internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes, tanks, and equipment.
14	This Set includes Rooms 2323, 2325, and 2341 and involves the removal and packaging of Gloveboxes 8, 9, 10, 12, 13, 1526, and Tank D-1575. Items internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and tanks.
15	This Set includes Room 2223 and involves the removal and packaging of Tanks D-934 A/B. Items internal to the contaminated tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the tanks.
16	This Set includes Rooms 3511, 3521, 3523, and 3525 and involves the removal and packaging of Glovebox 33; Precipitation Tanks T-11 A/B/C/D, T-12 A/B/C/D, T-13 A/B/C/D; Furnaces F-4 A/B/C/D, F-5 A/B/C/D, F-6 A/B/C/D; Pneumatic Lifts, ME-94 A/B/C/D, ME-95 A/B/C/D, ME-96 A/B/C/D, ME-97 A/B/C/D, ME-98 A/B/C/D, and ME-99 A/B/C/D; Fluorination Tanks T-23 A/B/C/D; Fluorination Pumps C-1A/B; and associated equipment. Items internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes, tanks, and equipment.

Table 4. Building 371/374 Dismantlement Sets

Set	Description
17	This Set includes Rooms 3515 and 3531 and involves the removal and packaging of Glovebox 32; Furnaces F-10 A/B/C, F-16 A/B/C; Pneumatic Lifts ME-23 A/B, and ME 39 A/B/C; Master/Slave Manipulators ME 100 A/B, and ME-169 A/B; Fluorination Pumps C-1A/B; and associated equipment. Items internal to the contaminated gloveboxes and equipment will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and equipment.
18	This Set includes Room 3801 and involves the removal and packaging of Gloveboxes 111, 112, 106, 108; Tanks D-808, D-812, D-813, D-814, D 815, D-816, D-817, D-818, D-819, D-820, D-821, D-822, D-823, D-826 A/B, D-827, D-845, D-878, D-883 A/B, D-884, and D-942; Polishing Filter FL-831; and Pumps P 810, P-811, P-812, P-817 A/B/C, P-828, P-837, P-838, P-843, P-845, P-846, P 852, P-857, and P-861. Items internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes, tanks, and equipment.
19	This Set includes Room 2804 and involves the removal and packaging of Gloveboxes 101 A/B, 102 A/B, 105 A/B, 155 A/B, 119; Tanks D-155A/B, D-801 A/B/C, D-802 A/B/C, D-804 A/B/C/D, D-811 A/B, D-824 A/B, D-843, D-847, D 851, D 852, and D-875; and Pumps 855 A/B/C. Items internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes, tanks, and equipment.
22	This Set includes Room 2801, 2802, 2805, and 2808 and involves the removal and packaging of Filter Plenums FP-321 and FP-322; Supply Air Units SAU-301, SAU-302, and SAU-303; Chiller Units 701 A/B; and Pumps 703 A/B/C. Items internal to the filter plenums and external equipment will also be removed. Piping, conduit, and ventilation duct to the plenums and equipment will be removed, as necessary, to facilitate access to the filter plenums and equipment.
23	This Set includes the Americium Processing Tank Vault (Room 3337), Americium Processing Jon Exchange Canyons (Rooms 3327, 3331 and Airlock 3329), the Americium Processing Valve Maintenance Corridor (Rooms 3323, 3325, 3331, 3333, and 3335), and Access Corridor 3341. This Set involves the removal and packaging of Gloveboxes 52 and 54; Tanks D 82 A/B, D-84 A/B, D-86 A/B, D-87, D-88, D 89 A/B, D 90, D-95; Evaporators E-39 A/B, E-40 A/B, E-41 A/B, and E-45 A/B; and Downdraft Tables DDT-11 and DDT-12. Items internal to the gloveboxes, tanks, and equipment will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes, tanks, and equipment
26	This Set includes Room 3602 and involves the removal and packaging of Gloveboxes 1, 2, 3 and Chainveyors, CV-27 and CV-62. Items internal to the gloveboxes and external equipment will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and equipment
29	This Set includes Rooms 3713, 3715, and 3717 and involves the removal and packaging of Gloveboxes 1509, 1510, 1514, 1521 A/B/C, and 1524. Items internal to these gloveboxes and external equipment will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and equipment.
30	This Set includes Room 3701 and involves the removal and packaging of Gloveboxes 1500 A/B, 1502, 1503, 1504, 1506, 1509, 1509A, 1512, 1513, 1516, and 1518; and Tanks 1507A/B, 1518D, 1525A/B/C, 1530 A/B, 1535 A/B, 1536A, 1538A, 1539A/B/C, 1543A/B, 1545A/B, and 1575. Items internal to these gloveboxes and external equipment will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and equipment.
38	This Set includes Rooms 2201, 2202, 2202 A/B/C, 2221, 2301, 2304, 2306, and 2316. Piping, conduit, and ventilation duct will be removed, as necessary, to provide support for adjacent Dismantlement Sets.
39	This Set includes the corridors on the sub-basement level. Items located in the corridor (i.e., external equipment) will also be removed. Piping, conduit, and remaining ventilation ductwork will be removed, as necessary, to provide support for adjacent Dismantlement Sets.

Table 4. Building 371/374 Dismantlement Sets

Set	Description
40	This Set includes Room 2203 and involves the removal and packaging of Filter Plenums FP-125 A/B. Items internal to these filter plenums and external equipment will also be removed. Piping, conduit, and ventilation duct to the plenums will be removed, as necessary, to facilitate access to the filter plenums and equipment.
41	This Set includes Room 2213 and involves the removal and packaging of Filter Plenums FP-241 and FP-242. Items internal to these filter plenums and external equipment will also be removed. Piping, conduit, and ventilation duct to the plenums will be removed, as necessary, to facilitate access to the filter plenums and equipment.
46	This Set includes Room 2207 and involves the removal of control equipment for ventilation and health physics vacuum equipment.
50	This Set includes a portion of Room 2310 and involves the removal and packaging of Filter Plenum FP-141. Items internal to the filter plenum and external equipment will also be removed. Piping, conduit, and ventilation duct to the plenum will be removed, as necessary, to facilitate access to the filter plenum and equipment.
51	This Set includes a portion of Room 2310 and involves the removal and packaging of Filter Plenum FP-142. Items internal to the filter plenum, and external equipment will also be removed. Piping, conduit, and ventilation duct to the plenum will be removed, as necessary, to facilitate access to the filter plenum and equipment.
52	This Set includes a portion of Room 2310 and involves the removal and packaging of Filter Plenum FP-243. Items internal to the filter plenum and external equipment will also be removed. Piping, conduit, and ventilation duct to the plenum will be removed, as necessary, to facilitate access to the filter plenum and equipment.
56	This Set includes a portion of Room 3801 and involves the removal and packaging of Gloveboxes 107 and 113 and Tanks D-806 and D-807 A/B. Items internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and tanks.
57	This Set includes Rooms 3810, a portion of Room 3809, and Room 4814 and involves the removal and packaging of Vapor Body Tanks T-802, T-803, and T-804; Tanks D-830, D-832, D-834, D-876, and D-879; Pumps P-819, P-820, P-821, P-822 A/B, P 823, P 824, P 825, P 840, and P-861; and Heat Exchangers E-806 A/B, E-807, E-808, E-809, E-810, and E-812 A/B. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the tanks and equipment.
58	This set includes Rooms 3803, 4805, and 4807 and involves the removal and packaging of Tanks D-825A/B, D-844A/B, and D-848; Gloveboxes 115 A/B, 116 A/B, 117A/B, and 118; drum handling equipment and Conveyors CV-808, CV-812, CV-813A/B, and CV-816; Sludge Dryer W-801; Dry Sludge Hopper H-3; Rotary Drum Filters FL-802 A/B; Vent Gas Scrubber T-807; Heat Exchangers E-804 A/B/C, E-817 A/B; and Pumps P-806 A/B, P-815 A/B, P-816 A/B, and P-862A/B. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and equipment.

Table 5. Cross Reference to Set Numbers Presented in the Building 371/374 Reconnaissance Level Characterization Report

Decommissioning Area[a]	Designation	RLCR Set #	RLCR Subset	DOP Dismantlement Set #	Room #	Notes
AL	Attic North	1	A	1	4301	Attic North
AM	Attic South/Chem Make-Up	1	B	2	4202	Attic South
AM	Attic South/Chem Make-Up	1	B	2	4303	Attic South
AH	Main Aqueous Processing	2	A	3	3517	Nitric Acid Recovery
AH	Main Aqueous Processing	2	B	4	3571	Nitric Acid Recovery
AH	Main Aqueous Processing	2	C	5	3573	Secondary Recovery
AH	Main Aqueous Processing	2	D	6	3543	GB Operating Aisle
AH	Main Aqueous Processing	2	D	6	3545	GB Operating Aisle
AH	Main Aqueous Processing	2	D	6	3547	VMC
AH	Main Aqueous Processing	2	D	6	3549	Ion Exchange Canyon
AH	Main Aqueous Processing	2	D	6	3551	Airlock
AH	Main Aqueous Processing	2	D	6	3553	Ion Exchange Canyon
AH	Main Aqueous Processing	2	D	6	3555	VMC
AH	Main Aqueous Processing	2	D	6	3557	GB Operating Aisle
AH	Main Aqueous Processing	2	D	6	3559	Oxide Tank Vault
AH	Main Aqueous Processing	2	D	6	3561	
AH	Main Aqueous Processing	2	D	6	3563	Residue Tank Vault
AJ	Americium Processing/SGS	3	A	7	3303	Vault
AJ	Americium Processing/SGS	3	A	7	3305	SGS Counting
AK	Wet Residue/SS&C	3	B	8	3204	Wet Residue Samp/Repack
AK	Wet Residue/SS&C	3	B	8	3206	Wet Residue Samp/Repack
AC	Central Storage Vault	4	A	9	1204	CSV Area
AC	Central Storage Vault	4	A	9	1206	CSV Area
AC	Central Storage Vault	4	A	9	1214	CSV Area
AC	Central Storage Vault	4	A	9	1216	CSV Area
AC	Central Storage Vault	4	A	9	1218	CSV Area
AC	Central Storage Vault	4	A	9	1220	CSV Area
AC	Central Storage Vault	4	A	9	1224	CSV Area
AA	East Side--CWTS	4	B	10	1208	Storage Vault
AA	East Side--CWTS	4	B	10	1210	Scrubbers
AA	East Side--CWTS	4	B	10	2217	Scrubbers
AB	West Side CWTS	4	C	11	1101	Storage Vault
AB	West Side CWTS	4	D	12	1103	CWTS
AB	West Side CWTS	4	D	12	1105	CWTS
AA	East Side--CWTS	4	D	12	1107	Pencil Tanks
AA	East Side--CWTS	4	D	12	1109	Pencil Tanks
AA	East Side--CWTS	4	D	12	1111	CWTS
AA	East Side--CWTS	4	D	12	1113	Control Room
AA	East Side--CWTS	4	D	12	1115	CWTS
AA	East Side--CWTS	4	D	12	1117	Incinerator/Scrubber
AA	East Side--CWTS	4	D	12	1125	CWTS
AA	East Side--CWTS	4	D	12	1127	Crit Tank Pit
AA	East Side--CWTS	4	D	12	2327	Incinerator/Scrubber

Table 5. Cross Reference to Set Numbers Presented in the Building 371/374 Reconnaissance Level Characterization Report

Decommissioning Area[a]	Designation	RLCR Set #	RLCR Subset	DOP Dismantlement Set #	Room #	Notes
AE	North Side-Basement	5	A	13	2307	
AE	North Side-Basement	5	A	13	2317	
AB	West Side CWTS	5	A	13	2319	
AD	South Side-Basement	5	B	14	2323	
AD	South Side-Basement	5	B	14	2325	
AD	South Side-Basement	5	B	14	2341	
AD	South Side-Basement	5	C	15	2223	Crit Tanks
AH	Main Aqueous Processing	6	A	16	3511	GB-33
AH	Main Aqueous Processing	6	A	16	3521	Precipitation/Calcination
AH	Main Aqueous Processing	6	A	16	3523	Fluorination
AH	Main Aqueous Processing	6	A	16	3525	Precipitation/Calcination
AH	Main Aqueous Processing	6	A	16	3529	Airlock
AH	Main Aqueous Processing	6	B	17	3515	GB-32
AH	Main Aqueous Processing	6	B	17	3531	Reduction
AN	Waste Processing - B374	7	A	18, 21, & 56	3801	
AN	Waste Processing - B374	7	A	58	3803	
AN	Waste Processing - B374	7	A	57	3810	
AN	Waste Processing - B374	7	B	19	2804	
AN	Waste Processing - B374	7	D	58	4805	
AN	Waste Processing - B374	7	D	21	4812	
AN	Waste Processing - B374	7	D	57	4814	
AN	Waste Processing - B374	7	E	22	2801	
AN	Waste Processing - B374	7	E	22	2805	
AN	Waste Processing - B374	7	E	22	2808	
AJ	Americium Processing/SGS	8	A	23	3325	VMC
AJ	Americium Processing/SGS	8	A	23	3327	Ion Exchange Canyon
AJ	Americium Processing/SGS	8	A	23	3329	Ion Exchange Canyon
AJ	Americium Processing/SGS	8	A	23	3331	Ion Exchange Canyon
AJ	Americium Processing/SGS	8	A	23	3333	VMC
AJ	Americium Processing/SGS	8	A	23	3335	Glovebox Operating Aisle
AJ	Americium Processing/SGS	8	A	23	3337	Americium Vault
AK	Wet Residue/SS&C	8	B	24	3408	Analytical lab
AK	Wet Residue/SS&C	8	C	25	3412	Analytical lab
AG	Wet Combustibles/PuSPS	8	D	26	3602	Salts and SS&C
AG	Wet Combustibles/PuSPS	10	A	29	3713	PuSPS
AG	Wet Combustibles/PuSPS	10	A	29	3715	PuSPS
AG	Wet Combustibles/PuSPS	10	A	29	3717	PuSPS
AG	Wet Combustibles/PuSPS	10	B	30	3701	Wet Combustibles
AJ	Americium Processing/SGS	11	A	31	3541	Drum Storage
AJ	Americium Processing/SGS	11	B	32	3501	Drum Storage
AJ	Americium Processing/SGS	11	C	33	3513	Drum Storage
AK	Wet Residue/SS&C	11	D	34	3420	TGS
AG	Wet Combustibles/PuSPS	11	E	35	3189	Drum Storage
AG	Wet Combustibles/PuSPS	11	E	35	3606	Drum Storage

Table 5. Cross Reference to Set Numbers Presented in the Building 371/374 Reconnaissance Level Characterization Report

Decommissioning Area[a]	Designation	RLCR Set #	RLCR Subset	DOP Dismantlement Set #	Room #	Notes
AG	Wet Combustibles/PuSPS	11	F	36	3709	Control Room
AE	North Side Basement	12	B	38	2014	Corridor
AE	North Side-Basement	12	B	38	2221	
AE	North Side-Basement	12	B	38	2202 A/B/C	
AA	East Side--CWTS	12	C	39	1006	Corridor
AD	South Side-Basement	13	A	40	2203	FP-125A/B
AD	South Side-Basement	13	B	41	2213	FP-241/242
AD	South Side-Basement	13	C	38	2202	FP 221A/B
AD	South Side-Basement	13	D	38	2202	FP-222A/B
AD	South Side Basement	13	E	38	2202	FP-223A/B
AD	South Side-Basement	13	F	38	2202	SAU-201/202/203
AD	South Side-Basement	13	G	46	2207	
AD	South Side-Basement	13	H	38	2201	ELEC ROOM
AE	North Side-Basement	13	J	38	2306	FP-121A/B
AE	North Side-Basement	13	K	38	2306	FP-122
AE	North Side-Basement	13	L	50	2310	FP-141
AE	North Side-Basement	13	M	51	2310	FP-142
AE	North Side-Basement	13	N	52	2310	FP-243
AE	North Side-Basement	13	P	38	2301	SAU-101/102/103
AE	North Side-Basement	13	Q	38	2304	ELEC ROOM
AE	North Side-Basement	13	R	38	2316	
AQ	Outbuildings/Trailers	14	A			
AQ	Outbuildings/Trailers	15				
AQ	Outbuildings/Trailers	16				

[a] Decommissioning Areas AF, AM, and AP are not included in this table because they are not associated with any Set (i.e., there is no anticipated Steelworker work in these areas)

Table 6. Building 371/374 Decommissioning Areas

Area	Area Description
AA	This Area consists of portions of the CWTS system and includes removal of any remaining piping, electrical, and ventilation systems in sub-basement Rooms 1208 (storage vault), 1210, 1214, 1216, 1218, 1222, 1109, 1111, 1113, 1115, 1117, and basement incinerator vent scrubber canyon, Room 2327. Interior surfaces will have paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surface decontamination (e.g., scabbling) will remove contamination. Room 1127 area contains surface areas associated with the criticality tank pit. Included are sub basement corridors Rooms 1001 through 1005, 1121, 1121A, 1123, 1124, and surface areas of the decontamination storage tank pit.
AB	This Area consists of portions of the CWTS system and includes removal of remaining piping, electrical, and ventilation systems in sub-basement Rooms 1101(storage vault), 1103, and 1105, and basement Room 2319. Interior surfaces will have paint removed to facilitate PDS. In process characterization will identify areas of surficial contamination, and surface decontamination (e.g., scabbling) will remove contamination
AC	This Area consists of the CSV, repair bay and maintenance area, and I/O Stations #1 through #8 and includes removal of remaining piping, electrical, and ventilation systems in sub-basement vault Rooms 1206 (central storage vault), 1220 (stacker/retriever transfer bay), 1218 (repair bay), and 1224 (maintenance bay). Interior surfaces will have paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surface decontamination (e.g., scabbling) will remove contamination
AD	This Area includes removal of remaining piping, electrical systems, and System #2 ventilation systems in basement Rooms 2201, 2203 2205, 2207, 2213, 2221, 2011, and 2325. Temporary ventilation systems will be installed to facilitate decontamination activities after filter plenum removal has been completed under the Dismantlement Sets.
AE	This Area includes removal of remaining piping, electrical systems, and System #1 ventilation systems in basement Rooms 2306, 2310, 2301, 2307, 2317, 2316, 2015, and 2016. Temporary ventilation systems will be installed to facilitate decontamination activities after filter plenum removal has been completed under the Dismantlement Sets.
AF	This Area includes removal of piping, electrical systems, and System #4 ventilation systems in basement office areas including Rooms 2101, 2103, 2102, 2107, and remaining administrative areas. In-process characterization will confirm radiological status and decontamination activities are not expected to be required.
AG	This Area includes removal of remaining piping, electrical, and System #1 ventilation systems in ground floor Rooms 3701, 3713 and 3717 (removed incinerators and afterburners for high and low specific activity wastes, now PuSPS), 3189, 3606, 3602, and corridor Room 3031B. Interior surfaces will have paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surface decontamination (e.g., scabbling) will remove contamination.
AH	This Area consists of the main aqueous processing area and includes the ion exchange, fluorination and precipitator canyons, and includes removal of remaining piping, electrical, and ventilation systems in ground floor Rooms 3559, 3563 (ion exchange tank vault), 3553 (on exchange canyon), 3549, and support Rooms 3545, 3543, 3557, 3521, 3531 (canyons), and support Rooms 3529, 3511, 3515, and 3523. Also included in this Area are Rooms 3517 and 3571 (nitric acid recovery), and 3573 (secondary nitric acid recovery). Interior surfaces will have paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surface decontamination (e.g., scabbling) will remove contamination.

Table 6. Building 371/374 Decommissioning Areas

Area	Area Description
AJ	This Area includes the americium canyons, and anion exchange canyon. Remaining piping, electrical, and System #1 ventilation systems in ground floor Rooms 3337, 3331, 3327 (canyons), and support Rooms 3321, 3325, 3333, 3335, 3513, 3501, 3301, 3303, 3305, 3315, and corridor Rooms 3035 and 3031A will be removed. Interior surfaces will have paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surface decontamination (e.g., scabbling) will remove contamination.
AK	This Area consists of the residue sampling and wet repack area, and includes the removal of remaining piping, electrical, and ventilation systems in ground floor Rooms 3202, 3204, 3206, 3208, 3408, 3412, and 3420. Interior surfaces will have paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surfaces will be decontaminated (e.g., scabbling).
AL	This Area includes removal of remaining piping, electrical, and System #1 ventilation systems in attic Rooms 4001, 4301, 4305, 4303, and 4307. Interior surfaces will have paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surfaces will be decontaminated (e.g., scabbling).
AM	This Area consists of the Chemical Make-Up Area and includes the removal of piping, electrical, and System #2 ventilation systems in attic Rooms 4202, 3189, 4101, 4102, 4103, 4104, 4105, and 4106. Interior surfaces will have paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surfaces will be decontaminated (e.g., scabbling).
AN	This area consists of Building 374, the Liquid Waste Process Treatment Building. Piping, electrical and ventilation systems remaining after dismantlement will be removed. Interior surfaces will have paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surfaces will be decontaminated (e.g., scabbling).
AP	This Area consists of office and support areas, maintenance, and cold laboratories in Building 371, and includes the removal of piping, electrical, and ventilation systems in office areas. In-process characterization will confirm radiological status and decontamination activities are not expected to be required.
AQ	This Area consists of remaining exterior surfaces (walls and roofs) of Buildings 371/374 and 12 structures/trailers (identified as 371A-K, 376A, 377, 378, Building 373 (cooling tower), and the carpenters shop), and includes the removal of remaining exterior surface-mounted electrical and clean piping systems to facilitate PDS. In-process characterization will confirm radiological status and decontamination activities are not expected to be required. Demolition of Building 371/374 will occur at the close of structural decontamination activities, and the completion of PDS, and included within this Area.

The sequencing of decommissioning activities is identified in the Building 371/374 Closure Project Schedule, discussed in Section 9.0 of this DOP. As shown on the schedule, decommissioning activities may be ongoing in two or more Dismantlement Sets and Decommissioning Areas at the same time.

4.4 Facility Component Removal, Size Reduction, and Decontamination

The *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities* describes the techniques and controls that will be used to perform these activities in the Type 3 and Type 2 facilities at RFETS. The following paragraphs describe the specific activities associated with the Building 371/374 Closure Project. In some instances, the sequences of activities and methods are specified. The information contained in this section is based on the current planning baseline. The actual sequence and selected methods may differ from what is indicated; however, as long as the activity remains within the scope of the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*, and consistent with RFCA and the DPP, this DOP will not be modified.

Throughout this section of the DOP, statements are made regarding the wastes and reusable or recyclable materials that will be generated from component removal, size reduction, and decontamination activities. These statements are based on process knowledge and are provided for information only. All materials and wastes generated during decommissioning will be characterized and managed in accordance with applicable procedures described in the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*. The final decision as to whether specific materials are reused, recycled, or disposed as waste, will be made by Project management and personnel on a case-by-case basis in accordance with the discussion in Section 5.4 of this DOP.

4.4.1 Removal of Ventilation and Filtration Systems

The primary ventilation systems for the processing areas of Building 371 consist of six supply-air handling units and 16 exhaust filter plenums. Two filter plenums (FP-125A and FP-125B) are dedicated to re-circulation and filtration of the inert atmosphere used in the CSV and in/out (I/O) stations. Five four-stage filter plenums (FP-141, FP-142, FP-241, FP-242, and FP-243) are dedicated to Zones I and IA ventilation. Six two-stage filter plenums (FP-121A, FP-121B, FP-221A, FP-221B, FP-222A, and FP-222B) are dedicated to Zone II ventilation, and three two-stage filter plenums (FP-122, FP-223A, and FP-223B) are dedicated to Zone III ventilation. Two-stage filtration of building ventilation is normally conducted in a re-circulation configuration.

The building ventilation zones are defined as follows:

- Zone I provides ventilation for primary confinement where highly radioactive material is handled. Zone I is maintained at the lowest pressure for gloveboxes, canyons, and conveyor enclosures.
- Zone IA provides the ventilation for primary confinement in vaults and open enclosures (i.e, hoods and downdraft tables).
- Zone II provides ventilation supply and exhaust for the secondary confinement. Zone II includes any areas containing Zone I and Zone IA equipment.
- Zone III provides ventilation for tertiary confinement in the building. Zone III areas are generally not contaminated.
- Zone IV provides ventilation for administrative areas and other uncontaminated areas.

System #1, a primary system, ventilates the north sections of the building. System #2, a primary system, ventilates the south sections of the building, and the inert system, which ventilates the CSV and the I/O stations. Systems #1 and #2 each contain four ventilation "zones." System #3 ventilates portions of the east office areas of the ground floor, the stairwell, and elevator areas. System #4 ventilates the east office

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areas in the basement level. System #5 ventilates the north and east ground floor office areas. System #6 ventilates the south section of ground floor area outside the material access area (MAA) containing the emergency generator and building electrical switch gear. The miscellaneous support system ventilates portions of the east office areas (Room 3185) on the ground floor, and portions of the Chemical Make-Up Area in the attic.

As facility components are removed and/or decontaminated, workers will complete the removal of remaining utilities, including building ventilation and exhaust filtration systems. Although the approach may differ on an area-by-area basis, the removal sequence will generally proceed as described below.

1) Airflow studies will be performed in accordance with the *RFETS Radiological Safety Practices Manual* to determine feasibility of dismantlement and decontamination activities, and identify potential problems and options.

2) Zone I and Zone IA plenums will be maintained until tanks, gloveboxes, downdraft tables, canyons, and ductwork have been stripped out.

3) Glovebox removal will be initiated at the glovebox furthest away from the plenum and work will continue toward the plenum to ensure that adequate air continues to flow from areas of least contamination to areas of higher contamination. Depending on access restrictions, there may be exceptions to this rule.

4) Airflow studies will continue throughout glovebox, tank, and downdraft table removal to ensure zones are balanced and negative pressure is maintained in accordance with the Building 371/374 BIO. Airflow will be balanced using Zones II and III systems and/or temporary ventilation and filtration systems.

5) Once Zone I and Zone IA tanks, gloveboxes, downdraft tables, and ductwork have been removed, the building areas serviced by that ventilation system may be decontaminated to meet the applicable unrestricted release criteria.

6) Plenums and associated ductwork will be removed.

7) Airflow will be balanced, if necessary, using temporary ventilation and filtration systems.

8) Surface contamination will be measured for Zone II and Zone III systems to determine feasibility of unrestricted release.

A fixative coating will be applied to selected ductwork surfaces to reduce the spread of contamination during ductwork disassembly and movement. The application of fixative coatings will require that ventilation be reduced or terminated in the selected ductwork. Reduction or termination of ventilation may affect or eliminate room and building work activities. Building differential pressures will be monitored to assure building balance and negative pressures are maintained following any reduction or termination of ventilation. Depending on levels of contamination, containments may need to be constructed for dismantlement activities. It is assumed that the use of containments will be minimal for Zone I and Zone IA, and will not be required for Zones II and III. This assumption is based on the successful use of fixatives.

As there are two separate ventilation systems in the processing areas of Building 371, an engineering study will be conducted to determine the most effective sequencing for de-energizing and dismantling the ventilation systems. This will provide information for maintenance of adequate building differential pressures and airflow during dismantlement and decontamination activities. The study will detail methods and procedures, and will incorporate the decommissioning schedule into airflow calculations.

Following application of the fixative and re-initiation of complete or reduced system airflow, rigging will be installed to hold and lower the disassembled ductwork. A containment tent or sleeve will be placed around the areas where ductwork will be separated to reduce the spread of contamination. Complete or

reduced ventilation system flow will be used to reduce the spread of contamination during ductwork separation. Mechanical cutting techniques and standard disassembly techniques (e.g., unbolting ductwork connections) will be used to disassemble ductwork sections. Open sections of removed ductwork will be sealed with plastic wrap and tape in preparation for transport to a size reduction facility. Open ductwork remaining connected to the ventilation system will be configured (e.g., blanked, capped, valved, or a HEPA filter will be installed in the opening) to support maintenance of negative pressure in the room or area and the building.

Penetrations through the floors for Zone I and Zone IA ventilation systems will be removed using concrete removal technologies (e.g., breaking, cutting, or coring methods). Penetrations will be removed before structural decontamination activities. Removal of the ventilation system scrubbers will require flushing and isolation before dismantlement of ventilation systems.

Ventilation system plenums may be disassembled just before building demolition activities. Plenums supporting a specific room or area of the building will not be removed until radioactive material holdup or contamination levels of the equipment or structure and corresponding ductwork are below safety analysis and/or radiation protection thresholds indicated in the Building 371/374 BIO.

Plenums will not be disassembled until all connecting ductwork has been removed to the filter plenum intake. Plenum disassembly is initiated by removing the primary stages of high efficiency particulate air (HEPA) filtration. Filters will be packaged in appropriate waste containers. Following primary filter removal, any ductwork openings will be sealed, unnecessary plenum interfaces (e.g., electrical, instrumentation) will be removed and sealed, and exhaust fans will be shut down. Temporary HEPA-filtered ventilation will be installed downstream, and the final stage of HEPA filters removed and packaged for disposal. Where appropriate, non-contaminated stages of the plenums will be separated from the contaminated sections.

Loose contamination in the plenums will be removed using wet wiping techniques. Depending on the situation, strippable coatings may be used to reduce contamination levels of the plenum surfaces. Application of fixatives or strippable coatings to plenum surfaces will reduce the spread of contamination during plenum disassembly.

Following the application of the fixatives or coatings, radiological surveys will be performed and all remaining plenum interfaces will be removed. Mechanical cutting techniques and/or plasma cutting techniques may be used to disassemble and size reduce the plenum for packaging in appropriate waste containers.

Building 374 contains dedicated ventilation systems. Removal will be accomplished in the same manner as the systems servicing Building 371. The primary ventilation systems for the waste processing area of Building 374 consist of three supply-air handling units, and three filter plenums, and two filter plenums (FP-322A and FP-322B) are dedicated to Zone I, two-stage HEPA filtration of tanks, equipment and areas within Building 374. One two-stage filter plenum (FP-321) is dedicated to Zone II exhaust ventilation.

4.4.2 Removal of the CSV and I/O Stations

The CSV in Building 371 is a room measuring 300 feet by 15 feet by 40 feet, with one-foot thick reinforced concrete walls. The CSV contains storage racks constructed of 4-inch by 4-inch steel channel frame designed to hold the 4-foot by 4-foot aluminum and stainless steel pallets, which are used to store and transport solid nuclear materials between gloveboxes within Building 371. The S/R is a computer-controlled remote mobile lifting mechanism, which moves the pallets between storage locations and I/O stations. The I/O stations are gloveboxes extending through the vault walls, up through the first floor, providing direct access to process gloveboxes, without bag-in or bag-out. The I/O stations contain hydraulic lifters. Additional rooms within the CSV are used as a repair bay, as an open area to allow the

S/R to be moved between rooms, and as a storage area for the spare S/R. The CSV and I/O stations are serviced by recycled, inert (i.e., nitrogen), Zone 1 (i.e., glovebox) atmosphere.

During deactivation, the storage pallets and maintenance pallets are removed from the CSV and adjacent areas and equipment will be prepared to support dismantlement and decontamination activities. Decommissioning will proceed using the following general approach:

- Dismantle primary and spare S/Rs.
- Survey and decontaminate to allow personnel access in PAPRS
- Remove storage racks and dismantle I/O stations.
- Dismantle transfer vehicle and repair lifts.
- Complete final decontamination of CSV structure.
- Perform required surveys.

During decommissioning, empty storage pallets (i.e., approximately 1,200 pallets) will be removed through I/O Station #8 and its associated glovebox line in Room 1111 of the sub-basement. A single storage pallet will be moved into I/O Station #8 at one time, using the existing S/R. Water will be removed from each of four double-walled stainless steel storage cans riveted to the aluminum base plate using vacuum. The water, which served as radiation shielding, will be collected in tanks pending transfer to an offsite treatment facility. The pallets will be decontaminated to SCO levels and transferred offsite for treatment and disposal. Once, all pallets are removed, the CSV will be decontaminated and a durable fixative will be applied to the floor to reduce airborne contaminates enough to allow workers to access the CSV in PAPRS.

Next, storage racks will be surveyed and removed. To accomplish this task, a man-lift or similar device will be installed in the storage area of the CSV to provide for manned access to the storage racks. Following assembly, the man-lift will be covered and moved with the stacker transfer vehicle to the maintenance bay for storage until manned entry can be accomplished. The primary S/R will be moved from the CSV to the repair bay using the stacker transfer vehicle. The repair bay door will be closed to isolate the repair bay from the CSV, and the ventilation for the bay will be reconfigured to support decontamination activities. The primary S/R will be surveyed to determine waste classification. Based on contamination surveys results, some or all of the S/R may be decontaminated to allow disposal as LL waste or a surface-contaminated object (SCO).[17] Major components of the S/R will be removed from the assembly and packaged for off-Site disposal. The mast, lift platform assembly, and carriage frame assembly will be segmented using plasma arc or other cutting technology, supported by the overhead bridge crane in the maintenance area. Using the overhead bridge crane, the removed materials will be transported through the floor access hatchway of Room 1218, and packaged in Room 1214 as LL waste or

[17] As discussed in the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*, the level of radioactive contamination, glovebox construction, and the presence of hazardous constituents will determine the method selected. The surface contaminated object (SCO) criteria allow some items to be removed and shipped as its own container. SCO is a U.S. Department of Transportation (DOT) category of low-level waste. SCO dispositioning is preferred because of the significant potential for reducing worker exposure levels and work hours required for removal. SCO dispositioning will be used when the following conditions are met:

- The majority of glovebox surfaces must be accessible by surveying equipment to ensure there is no concealed nuclear material inventory or holdup.
- Both fixed and removable radioactive contamination must be below the maximum allowable DOT levels
- Inherently hazardous constituents must be removed from the exterior and interior of the glovebox, allowing the glovebox itself to be characterized as non-hazardous. Examples of hazardous constituents include leaded glass windows and lead-lined glovebox gloves. For gloveboxes that previously stored characteristic waste only, this will occur once waste residuals have been removed. Gloveboxes previously storing listed wastes will be considered non-hazardous once the "clean debris surface" standard has been met following decontamination

SCO. Manned entry to the CSV will be accomplished in powered air purifying respirators, and any loose items will be removed and packaged for disposal as TRU waste.

A specially engineered winch system will be installed to facilitate the segmenting and lowering of removed rack assemblies. The winch system will be designed to lower the vertical sections of rack assemblies to the floor in a controlled manner. The racks will be removed as one "ladder section" at a time. The vertical rack assemblies (i.e., ladder sections) will be supported at the top with the winch system. The wall brackets will be cut free using plasma arc or mechanical cutting, the 4-inch by 4-inch vertical masts will be severed six inches below the ceiling, and the masts will be notched within working distance of the floor. The severed section of vertical rack system will then be lowered to the floor from the top, the 4-inch by 4-inch masts will be segmented, and the sections will be laid flat on the floor.

Segmentation of the "ladder" sections will then be accomplished at floor level using plasma arc or mechanical cutting methods, and the pieces packaged as TRU waste. Should in-process characterization indicate that removed rack pieces can be decontaminated to LL waste or SCO, they will be decontaminated at floor level before waste packaging. Upper and lower pieces of the vertical mast assembly will be removed before proceeding to the next vertical mast assembly. This operation will be completed for each vertical mast section until all storage racks have been removed.

Upon completion of rack size reduction, the I/O stations will be decommissioned in a manner similar to other contaminated gloveboxes. Hydraulic lift stations and transfer vehicles will be decontaminated, (or loose contamination will be "fixed"), dismantled, segmented, and packaged for disposal as TRU waste. I/O stations will be isolated with steel plates mounted at the floor line. The I/O stations will be decontaminated when the CSV is decontaminated.

The stacker transfer vehicle and maintenance repair lift will be removed, segmented, and packaged as LL waste or SCO. The CSV, maintenance bay, and repair bay will be prepared for final decontamination. If hydrolasing is the selected method, criticality-safe pumps and collection containers will be installed to collect hydrolasing water. Paint will be removed from upper structural surfaces (i.e., walls and ceilings) using a grit blasting or similar method. Floor areas may be decontaminated using mechanical scarifying equipment. Components embedded in the concrete (e.g., plates, anchors, rails, and penetrations) will be removed. Leaded glass windows and maintenance bay glove ports will be removed and the openings covered. Initial surveys will identify surface areas (i.e., floors, walls, or ceilings) requiring further decontamination. Additional decontamination will be performed, as necessary, until surface areas meet the following criteria: 1. Within 6 feet of the surface – unrestricted release and 2. Below 6 feet – 7 nCi/g averaged over the first 7 inches of concrete. .

4.4.3 Removal of the Canyons

The term "canyon" refers to the rooms located on the Building 371 side of Building 371/374 that were designed to contain process equipment too large to be placed in gloveboxes. These rooms are serviced by Zone I and IA ventilation. The canyons include the incinerator scrubber canyon (Rooms 2327, 1117, and 1125), precipitation/calcination canyon (Room 3521), fluorination canyon (Room 3523), reduction canyon (Room 3531), residue ion exchange canyons (Rooms 3549 and 3553), residue ion exchange valve maintenance corridors (Rooms 3547 and 3555), and residue ion exchange tank vaults (Rooms 3559 and 3563). Equivalent canyons are located in the americium processing area (Rooms 3325, 3333, 3327, 3331, and 3337).

During deactivation, SNM is removed from the canyons, non-actinide liquids will be drained, and loose material and equipment will be removed and packaged as TRU or TRM waste. During decommissioning, the mechanical and process equipment will be decontaminated (if necessary), size reduced, and packaged for disposal as TRU or TRM waste. Work in the canyons will require use of respiratory protection.

Prior to decontamination, mechanical and process equipment will be removed, manually size reduced, and packaged for disposal as TRU or LL waste. Paint will be removed from upper structural surfaces using an abrasive grit blasting or similar method. Floor areas will be decontaminated using strippable coatings and/or mechanical scarifying equipment to remove the top ½-inch of concrete; contamination in cracks will be chased and removed with portable scabblers or needle guns. Water-filled windows will be drained, leaded glass removed, and window openings decontaminated and sealed with steel plates. Piping, mechanical, and electrical penetrations will be cleaned with an abrasive material and the penetrations sealed to prevent re-contamination. Surveys will identify surface areas (i.e., floors, walls, or ceilings) requiring additional decontamination. Additional decontamination will be performed, as necessary, until surface areas meet the applicable unrestricted release criteria.

Based on available information, and with the exception of spills that have occurred in the incinerator scrubber canyon, spills in the canyons have been limited to minor leaks or overflows directly beneath the valves or tanks. As these areas have not been exposed to liquids, it is anticipated that concrete interfaces (e.g., construction joints, floor to wall, wall to ceiling) are not contaminated beneath the painted surface layer. To eliminate the potential for migration of contamination through the concrete, only dry decontamination methods will be used in the canyons. Structural surfaces will be decontaminated using abrasive grit to remove paint from the surfaces above the floor level. Floors will be scarified with mechanical equipment to an initial depth of ½-inch. Floors or walls with deep contamination will be identified (as to depth of contaminants), and concrete will be removed during the decontamination process or the areas will be sealed and removed before demolition of the structure. The following paragraphs describe the individual canyons and associated hazards.

4.4.3.1 Incinerator Scrubber Canyon

The incinerator scrubber canyon in Rooms 1117, 1127, and 2327 (Dismantlement Set 12), is the lower half of the original canyon that stretched the complete height of the building. The canyon originally housed the scrubbers for off-gas from the incinerators, piping, caustic tanks, and pumps necessary to run the systems. The sub-basement level also contained the acid backwash for the CWTS, used to make the CWTS oxide precipitate acceptable as feed to the ion exchange system on the ground floor.

During facility upgrades in 1987, the incinerators and the top portion of the scrubbers were removed to below the ground level, the areas decontaminated, and a new ground floor poured. The added concrete floor must be removed before the demolition of the structure. Room 2327 is moderately contaminated and will be stripped out as LL waste. The sub-basement, separated from the basement by a grating, is more highly contaminated as a result of backwash system leaks. The residual liquids and caustic crystals were cleaned up in the early 1990s, and a painted coating was applied to seal the floor from future leaks. Most of this waste will be LL waste.

4.4.3.2 Precipitation/Calcination Canyon

The precipitation/calcination canyon in Room 3521 (Dismantlement Set 16) housed the process system that was used to convert plutonium nitrate solutions into plutonium oxide feed for the fluorinators. The equipment consists of two "carousels," each containing stations and an automatic transportation system for moving the filter boats to Glovebox 33. The stations are located on a seismically qualified structure attached to the floor. Each station consists of a 6-foot by 4-inch diameter stainless steel pencil tank and a circular, refractory-containing calciner, 2½ feet in diameter and 1½ feet high. Numerous additional liquid and solenoid valves and instrumentation are located on racks in the rooms. The precipitation process proceeded through hot start-up, during which numerous batches of nominal 100 gram per liter plutonium nitrate per 1 molar nitric acid slurries were dumped to the canyon floor. After testing was discontinued, the plutonium oxide was cleaned up; leaving the floor pitted and paint peeled in places. In some localized

areas, gram-levels of contamination may exist; however, due to the limited period of use, it is anticipated that excessive, widespread penetration of contamination into the concrete is unlikely.

4.4.3.3 Fluorination Canyon

The fluorination canyon in Room 3523 (Dismantlement Set 16) housed the fluorination process that was used for a limited start-up period to process plutonium oxide from in Building 771. Oxide was pneumatically introduced from Glovebox 33 into four fluidized-bed columns in Room 3523. The room also contains the off-gas dust separators, pneumatic piping to the reduction canyon, and various instrumentation. Because of the limited start-up period and the dry nature of the process, the contamination introduced during start-up should not have penetrated the surface paint. Additional contamination due too cross contamination from airflow or tracking of contamination from the more-contaminated precipitator canyon should be readily removable.

4.4.3.4 Reduction Canyon

The reduction canyon in Room 3531 (Dismantlement Set 17) housed the reduction process, which was also used only during start-up. Plutonium fluoride was transferred from the fluorinators to the reduction "carousel," magnesium metal added, the material ignited, metal and slag phases allowed to separate and cool, and the coalesced plutonium metal "button" was removed using manipulators. Final processing and packaging occurred in Glovebox 32. The levels of contamination on structural surfaces should be similar to that of the fluorinator canyon; powdery in nature and with little penetration into the paint. Cross-contamination from airflow or tracking of contamination from the more-contaminated precipitator canyon also may have occurred. Glovebox 32 has recently been used to process residues, which may contribute an additional source of contamination to this canyon.

4.4.3.5 Residue Ion Exchange Canyons

The residue ion exchange canyons in Rooms 3549 and 3553 (Dismantlement Set 6) contained the processes that received liquids from the oxide and residue dissolution lines in Room 2325 via the tanks in Rooms 3563 and 3559, purified and concentrated the plutonium nitrate, and prepared the solutions for precipitation in the precipitator canyon. The system was integrated with tanks in the tank vaults, controlled by the valves in the valve maintenance corridors, fed by the pumps and filters in the pump gloveboxes, and supported by the nitric acid recovery process in Rooms 3571 and 3573. The ion exchange canyons extend into the attic space. The equipment consists of numerous columns, pencil tanks, and evaporators hung vertically along the sides of the canyons. During start-up testing, significant liquids were run through the ion exchange columns and evaporators. Historically, there was localized dripping of plutonium nitrate. Liquids have since been drained from the tanks and the resin has been removed from the columns (9 columns have been removed). It is anticipated that contamination consists of localized acid-etched areas on the floor, and some splash areas on the walls.

4.4.3.6 Residue Ion Exchange Valve Maintenance Corridors

The residue ion exchange valve maintenance corridors in Rooms 3547 and 3555 (Dismantlement Set 6) are long, narrow rooms that wrap around the perimeter of the ion exchange canyons, and contain the solenoid valves and other equipment in an environment that was intended to be more benign than that of the ion exchange canyons. The valve maintenance corridors are comprised of two levels: an upper level, extending into the attic that contains reagent valves, and a lower level, containing valves for plutonium nitrate solutions. The outer wall of the valve maintenance corridors consists of the backside of the pump gloveboxes. As a result, removal of the valve maintenance corridors will be carefully coordinated with removal of the pump gloveboxes. Some valves leaked during start-up testing, and there are areas of localized acid etching on the floors and walls. Pump gloveboxes and downdraft tables will be removed first to provide access to the valve maintenance corridors.

4.4.3.7 *Residue Ion Exchange Tank Vaults*

The residue ion exchange tank vaults in Rooms 3559 and 3563 (Dismantlement Set 6) provided feed storage for the ion exchange process. Solutions originally stored were the liquids from dissolution; however, over the years various solutions of lower plutonium concentrations were added. The tanks contained contaminated acids for more than ten years. Although there is no record of any large spills, leaks from valves and sight glasses contributed to localized, acid-etched contaminated areas. The tanks were drained during the actinide-draining program in Building 371, completed in FY98. The raschig rings have been removed and the tanks will be decontaminated to SCO or LL waste during building deactivation.

4.4.3.8 *Americium Processing Area*

The americium processing area in Rooms 3323, 3325, 3327, 3331, 3333, and 3337 (Dismantlement Set 23) was never placed in service. The intended purpose of this process was to purify americium from the molten salt extraction process in Room 3305. The configuration of the canyons in this area is similar to the ion exchange canyons, with tank vaults and valve maintenance corridors surrounding an americium ion exchange canyon. In the early 1990s, the equipment in the tank vault and ion exchange canyons was stripped out and the rooms converted to secured storage vaults to support residue and International Atomic Energy Agency (IAEA)-monitored material storage. The valve maintenance areas and pump gloveboxes remain as installed, and are reported to have become contaminated during ventilation reversals.

4.4.4 Removal of Conveyors, Chainveyors, and Transfer Systems

Building 371/374 is equipped with several types of devices that are used to introduce material into, and transfer material between, systems and processes. These include I/O stations, conveyors, chainveyors, and transfer systems (e.g., pneumatic, vacuum).

Conveyors are electrically driven devices used to move items along a chain or roller. Chainveyors are used in many gloveboxes to transfer tools, equipment, and plutonium residues for processing or packaging. The chainveyors are rectangular in shape and flanged at each end. The flanges are bolted together to provide an airtight housing. Typically, the chainveyors are located near the dropped ceiling to minimize operator interference. The chainveyors also serve to direct ventilation flow and maintain containment during material transfer. Lead shielding mounted on the outside of the chainveyors is used to reduce personnel exposure. The Building 371/374 pneumatic transfer system consists of 24 polyethylene lines through which liquid and solid samples and used Fulflo™ filter cartridges were transferred between gloveboxes. The vacuum transfer system consists of 31 polyethylene lines, through which highly radioactive materials were moved between gloveboxes using differential pressure. Two of the vacuum transfer lines also employed argon and nitrogen pressures as the motive force.

During decommissioning, the conveyors, chainveyors, and transfer systems will be disassembled, size reduced (if necessary), decontaminated (if necessary), characterized, and packaged for off-Site disposal as LL waste or SCO. Lead shielding may be removed before packaging. The removal sequence will vary from location to location. However, because many of these systems have internal contamination, the opening to each section will be contained (e.g., sealed with plastic and tape) during the removal process and ventilation will be maintained, as necessary, to prevent a release of contamination to the environment.

4.4.5 Size Reduction

Size reduction is the process of reducing equipment to a size compatible with the intended waste container. There are two types of size reduction: central size reduction and in situ size reduction. The

major benefits of using central size reduction facilities (CSRFs) over in situ size reduction systems (ISSRs) include a higher level of worker safety through the use of automated tools to reduce manual handling of components; a reduced requirement for personal protective equipment (PPE); and enhanced ventilation and packaging controls, which promote worker safety. An additional benefit is the increased productivity that these facilities have demonstrated in other on-Site applications.

Following are the decision criteria for how a glovebox, tank, section of duct, or piece of equipment should be size reduced and the order in which the decisions will be made:

1) An SCO option will be evaluated and is always preferable for glovebox removal and disposal because it reduces or eliminates the need to size reduce equipment.

2) If the glovebox cannot fit through any door of the room, even with the transom removed, the glovebox (or tank) will be size-reduced in situ by mechanical means.

3) If the glovebox is too big to fit in the elevator and cannot be readily moved to a size reduction tent (SRT), then the glovebox will be size reduced by mechanical means.

4.4.5.1 Central Size Reduction

Centrally-located size reduction facilities are being installed in Buildings 371, 707, 771, and 776 to disposition gloveboxes, ventilation ductwork, tanks, and other process equipment that cannot be economically decontaminated to SCO and are small enough to be readily disconnected and moved.

A size reduction tent has been installed in Room 3305 in Building 371. This enclosure will be connected to the portable ventilation and utilities systems and operate throughout the decommissioning phase of the Project. SRT uses both automated and manual means to size reduce equipment and a hoist for material handling and transfer. Generally, waste from the SRT will be packaged in standard waste boxes sleeved to the SRT. When filled the sleeve will be "cut" from the SRT sealed and moved to the loading dock for off-Site shipment.

The overall process to prepare candidate equipment for centralized size reduction involves the following steps.

- The exterior equipment, piping, and tanks are removed from the equipment and the equipment is decontaminated.
- The equipment is characterized and a decision is made on SCO, in situ, or centralized size reduction for disposition.
- Remaining contamination is fixed.
- The equipment is isolated from Zone 1 ventilation and disconnected from utility connections. The equipment is partially dismantled, if necessary, and the legs and other ancillary appurtenances are removed. The equipment is sleeved, wrapped, and moved to the SRT staging area.

4.4.5.2 In Situ Size Reduction

This section applies to ISSR operations for gloveboxes, ventilation duct, tanks, and other process equipment that cannot be economically decontaminated to SCO and cannot be disconnected or moved, or will not fit into a CSRF. The overall process to prepare candidate equipment for ISSR involves the following general steps:

- The equipment, piping, and tanks are removed from the equipment and the equipment is decontaminated.

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- The equipment is characterized and decision is made on SCO, in situ, or centralized size reduction for disposition.
- Contaminated surfaces are fixed.
- Soft sided containment is designed and erected around the equipment. Soft-sided containments will be connected directly to Zone I or IA ventilation or equipped with self-contained HEPA ventilation systems. Ventilation will be configured to maintain sufficient inward airflow to contain airborne contaminants.
- The necessary tools, equipment, materials and supplies are mobilized along with support services.
- The equipment is isolated from Zone I ventilation, disconnected from the equipment and utility connections removed. The equipment is then dismantled and other ancillary appurtenances removed and packaged for disposal. The dismantlement operation will include removals, cutting, and other size reduction operations that are necessary to fit the glovebox into appropriate containers.
- Once the equipment is removed, the interior of the soft-sided containment is decontaminated, along with all tools, equipment and materials, or packaged for disposal.
- The equipment is removed and packaged for disposal.

4.4.6 Decontamination

Structural decontamination will involve the removal of residual contamination from the structure, removal of contaminated structural components (e.g., block walls, partitions), removal of remaining utility systems, decontamination of the remaining structure, and the initial confirmatory survey of release status. Decontamination is defined as the removal of contamination from building and equipment surfaces and beneath surfaces by manual, mechanical, chemical, or other means. The purpose of decontamination is to reduce exposure to radiological and chemical hazards, minimize the generation of radioactive and hazardous waste, and to salvage equipment and materials for future use. Decontamination will be conducted in accordance with the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities* and consistent with the DPP and Modifications to RFCA Attachments, approved June 2003.

The Building 371/374 structure will be dispositioned in accordance with the framework for contaminated soil in accordance the Modifications to RFCA Attachments, approved June 2003. Based on the Modifications to RFCA Attachments, approved June 2003, decontamination and facility preparation before demolition will adhere to the following criteria:

- The Building 371/374 slab and structure within 0 to 6 feet of the final proposed grade will be decontaminated to the unrestricted release criteria and structure within 0 to 3 feet of the final proposed grade will be removed during demolition.
- The Building 371/374 slab and structure below 6 feet of the final proposed grade will be decontaminated to ensure that it will not exceed 7 nCi/g averaged over the first 7 inches of concrete and encapsulated to ensure that the removable contamination will not exceed the unrestricted release criteria.

It is anticipated that if the contamination is surficial, it will generally be decontaminated. If the contamination extends several inches into the concrete, the concrete will generally be removed, if it exceeds 7 nCi/g criteria. The internal areas of the structure will be dismantled based on the schedule for Dismantlement Sets. At the close of the dismantlement activities, the areas will be empty of all

gloveboxes, tanks, and systems providing services to gloveboxes and tanks. The Zones I, IA, and II ventilation systems will have been removed to the nearest isolation point and ACM removal will be complete. However, the electrical systems supplying lighting and distribution will remain in place. Room or area walls will be used as containment barriers, or temporary containment barriers will be installed to ensure that decontamination activities will be isolated from adjacent areas. Mobile HEPA ventilation will be installed for ventilation in areas undergoing decontamination activities. HEPA ventilation exhausted to the environment will be monitored or exhausted to the remaining building ventilation systems. Dismantlement activities associated with identified Sets will be accomplished before dismantlement and decontamination activities associated with the Decommissioning Areas. The decontamination of Building 371/374 structures will be performed in the following general sequence:

1) Remaining electrical systems (conduit, switches, and distribution of electricity) will be removed. Temporary electrical services will be installed, as necessary.

2) Remaining safety systems will be removed back to the Decommissioning Area boundary, and any necessary modifications performed to replace required safety items.

3) Remaining utility supply systems (water, air, etc.) will be removed to the Decommissioning Area boundary; and temporary services will be installed to support the decontamination activities.

4) Before characterization, the interior concrete surfaces in contaminated areas will be cleaned using an abrasive decontamination technique unless sub-surface paint sampling has demonstrated radiological characterization meeting unrestricted release criteria. Removed paint debris will be packaged for disposal as TRU waste.

5) Scaffolding will be installed or personnel man-lifts will be used to access upper walls and ceiling areas, which will be decontaminated first. Concrete ceilings will be decontaminated (as necessary) initial surveys completed, and the decontaminated surfaces covered to prevent re-contamination.

6) Upper and lower walls will be decontaminated, as necessary, and preliminary surveys completed. Scaffolding will be removed to allow decontamination of the floor surfaces.

7) Contaminated floor areas exhibiting penetration of less than one inch will be scabbled to remove contamination. Surface cracks in the floor slabs will be decontaminated with "crack chaser" scabbling equipment.

8) Floor drains and "below-slab" services will be isolated or removed.

9) Areas exhibiting residual contamination following the initial PDS will be physically isolated, decontaminated, and re-surveyed.

10) Waste will be removed from the Decommissioning Area

11) Systems and equipment attached to the exterior surfaces of the structure will be removed, and initial PDS surveys completed.

12) Following decontamination of the exterior structure and removal of remaining asbestos roofing materials, final surveys of the building structure will be completed.

4.5 Facility Demolition

This section contains extensive information on the Building 371/374 Closure Project approach to demolition. In some instances, the sequence of activities and methods are specified. The information contained in this section is based on the current planning basis. The actual sequence and selected methods may differ from what is indicated in this section. As along as the activity remains within the scope of the *RSOP for Facility Disposition* and consistent with RFCA and the DPP, this DOP will not be

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modified. In accordance with the *RSOP for Facility Disposition*, a contractor demolition plan will be prepared including the minimum requirements specified in that document. In addition, the contractor demolition plan will detail how areas of fixed contamination will be protected during demolition activities and the project will mitigate potential areas of void space. It is anticipated that in areas where contamination will remain, the following conditions will apply:

- The location, area, and type/quantity of the contamination will be delineated and included in the Project Closeout Report
- The contamination will be fixed and encapsulated, which could include paint and commercial brand encapsulants
- Material will be placed over the area to minimize the potential for disturbance during demolition. The material could consist of soil and/or gravel placed in 3 foot or greater lifts over the area.

The current demolition strategy proposes the use of explosives. Explosives will not be placed in portions of the structure that do not meet the unrestricted release criteria. Additional information on the demolition method, sequence of activities, and quantities and placement strategy for the explosives will be developed as the decommissioning progresses. In accordance with the *RSOP for Facility Disposition*, the use of explosives will be evaluated for its effects on worker health and safety and the environment, and for its cost-effectiveness, as compared to mechanical demolition techniques. Site personnel, the regulatory agencies, stakeholders, and the explosives contractor will be involved in the evaluation process.

Demolition activities will be planned at an appropriate time in the closure process, before completion of the PDS. Actual demolition will not proceed until the LRA has concurred with the PDSR and stakeholders have been notified of the demolition schedule and techniques to be used to demolish the facility.

The scope of demolition activities includes the structures, facilities, and appurtenances associated with the 371/374 Closure Project, such as retaining walls, loading docks, pads, temporary structures, and underground utilities and structural features to the edge of the foundations. Sidewalks, fences, and aboveground exterior utilities will be removed on a case-by-base basis and coordinated with the Remediation, IA Decommissioning, and Site Services (RISS) Project. Asphalt roadways and the remaining underground utilities will be addressed under a separate ER decision document. Soils removed incidental to demolition activities will be managed in accordance with the *RSOP for Asphalt and Soil Management* (when approved).

Facility demolition will be accomplished using a variety of mechanized equipment combined with the engineered and controlled use of explosives. Tracked excavators fitted with quick change attachments are the preferred piece of equipment, using a variety of hydraulic shears, grapples, thumbs and vibratory demolition hammers to accomplish various demolition needs. A large tracked excavator properly outfitted can be used effectively on most two to three-story demolition applications. Additionally, the detachable tools can be fitted with remote operated fogging water-spray nozzles for dust control purposes. During demolition, airborne dust will be monitored on a visual presence or absence criterion, with dust control water spray being applied as required from a fire hose equipped with a fog nozzle.

Excavators may direct-load debris into disposal containers or trucks, or front-end loaders may be brought in, depending on the haul distance. Should a building structure or system be too tall to demolish with a large excavator, a crane and wrecking ball combination will be mobilized. The general sequence of activities associated with the demolition of the 371/374 Closure Project is as follows:

- Mobilization,
- Demolition site preparation,

- Removal of overhead obstructions.
- Removal of Site features required to execute demolition (paved lots and streets for ease of access, retaining walls, inactive exterior fire system components).
- Demolition of outbuildings and Site features (e.g., cooling towers, trailers, tanks, outbuildings, ASTs),
- Demolition of structures and appurtenances specific to Building 371/374 but independent of the main Building 371 structure. These areas will include the Building 374 structure as well as the Support Facility located along the south side of Building 371 and connecting Building 371 to Building 374, and the Switch House and Switch Yard located along the north side of Building 371. Implosion of the main Building 371/374 structure after using the Building 371 as the containment for ER activities.
- Completion of the main Building 371/374 structure demolition using tracked equipment to remove remnant walls and foundation items to a depth at least 3 feet below adjacent grade.
- Placement of an engineered backfill of the Building 371 footprint.
- Demolition site cleanup, and
- Demobilization.

The demolition sequence is based on technical requirements. However, starting the demolition process on the smaller outbuildings will ensure that the process is refined before the more complicated structures are initiated.

Work area boundaries and personnel protection equipment will be established in the health and safety plan, radiological work permits (RWPs), and job hazard analysis. Project area air sampling and personnel monitoring will be used to verify these protection factors/controls are effective. Project area air sampling and personnel monitoring could involve high and/or low volume air samplers within the work area and lapel air samplers. Based on the results of this monitoring and the ambient conditions, the controls may be increased or decreased, as necessary throughout the demolition project.

Radiological controls and monitoring during demolition will be performed in accordance with the DOE approved Site Radiation Protection Program (RPP), RPP-0001, Revision 3. The Site RPP is implemented through the Site Radiological Control Manual, MAN-102-SRCM, Revision 1 and the Radiological Safety Practices Manual, which implements the requirements of 10 CFR Part 835. These requirements and implementing documents are focused on occupational (worker) exposure and protection and are based on the process of maintaining worker exposure to ALARA.

4.5.1 Mobilization

Demolition will begin with the mobilization of the demolition contractor followed by demolition site preparation. A central staging area will be established in an existing improved area, such as the paved area off the northwest corner of Building 371. The decommissioning contractor may mobilize the following items: office trailers, shower facilities, lunchroom, portable toilets, hand wash units, and tool/equipment storage.

4.5.2 Demolition Site Preparation

As part of demolition site preparation, existing features associated with Site utility systems will be located, marked, and evaluated for isolation purposes. The sanitary sewer system will be isolated to prevent inflow of inappropriate wastewater generated by demolition dust control activities.

Electrical power requirements will be identified as part of the planning process. Maintaining sump and foundation pumps for control of groundwater and some area lighting will be necessary. However, it is

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likely that all power fed from the main distribution substation located on the East Side of Building 371/374 will eventually be terminated and decommissioning activities will be supported by temporary power.

Protective barriers or fences will be erected around permanent Site features designated to remain during demolition and ER. Electrical distribution switch gear, overhead electrical distribution lines, area lighting, and fire protection system hydrants and post indicator valves that will remain operational during and/or after the demolition will be protected as required, and flagged for added operator awareness and overall visibility.

As necessary, run-on and run-off control features will be implemented; temporary diversion berms, erosion control silt fencing and interceptor ditches will be installed; and existing drainage culverts and ditches will be cleaned out as required to divert significant overland flow away from the demolition site. The installation of run on/run-off control features will be coordinated with Environmental Systems and Stewardship personnel responsible for the surface water monitoring system surrounding the demolition site.

Traffic patterns and specific-loading areas for waste management will be established, as will temporary stockpile areas for debris. For any backfill material that will be stockpiled for a long period of time, a more permanent area will be created that will encompass additional erosion or run-on/run-off controls as necessary. The location of any long-term backfill stockpile area will be coordinated with the ER Project. Finally, any known contaminated surficial soils in the areas immediately adjacent to planned demolition activities will be delineated and controlled by ER personnel.

4.5.3 Removal of Site Features

Initial demolition activities will also involve stripping remnant equipment, rooftop entry/landing deterrent systems, ventilation stacks, filter housings, and other miscellaneous materials from rooftops. The removal of overhead obstructions will reduce the possibility of equipment coming in contact with energized electrical lines, and will allow access for operating cranes and long-reach tracked excavators. The removal of remnant equipment is required early in the process to free up the roof system for removal of potential ACM in the membrane of structures with older, multiple fiber-ply, built-up roofing systems.

4.5.4 Removal of the Type 2 Aboveground Storage Tanks

Tanks T-802 through T805, Vapor bodies, are RCRA permitted-process tanks located on the north wall of Building 371, due east of the breathing air compressor station. The tanks are mounted on the second floor of a two-story steel framework that is supported on cast-in-place concrete piers. Tanks T-802 through T-805 are the most western of the four tanks, are carbon-steel tanks used to store process water, and are approximately 6 feet in diameter by 9 feet tall.

The tanks will be declared operationally empty and an interior inspection will be performed. It is anticipated that some water-soluble dry residue remains in the bottoms of the tanks and on interior surfaces. These residuals will be removed as required for tank disposal.

All piping, electrical conduit, controls and instrumentation will be removed for disposition as recyclable, or for scrap. Tanks will also be stripped of insulation systems. The tanks will be detached from the overhead rack and lifted intact onto a suitable flatbed or lowboy trailer, and then transferred off Site for disposal as SCO hazardous waste. The steel framework and any remaining transfer piping will also be transferred off Site for recycling at this time. All remaining electrical and mechanical support equipment will be disposed as items suitable for recycle, or as scrap. Insulating materials, along with other incidental non recyclable items, will be disposed as solid waste at a permitted off-Site sanitary landfill.

The concrete pads will be removed for recycling. Underground utilities in the area will be cut and capped within the concrete pad footprint, and the depressions will be back-filled and graded to match immediately adjacent elevations and conditions.

Tank T-228 (a.k.a. Tank W-803) is a spray dryer used to dry the vapor stream issued from T-805, 4th effect vapor body, through the D-878 spray dryer feed tank. It is located outside Building 374, due north of Room 3809, mounted on a two-story steel frame structure. It is a carbon steel tank and hopper arrangement with the straight side upper portion being 16 feet in diameter by 6 feet tall, with an overall height of 26 feet. It is painted black. The straight side portion is housed in a penthouse on the second story of the steel framed support structure, sided and roofed with corrugated transite (ACM) panels, and resting on an elevated concrete platform. Also mounted on the platform is the F-801 spray dryer furnace, D-807 combustion air blower, electrical power and controls, and associated ducting and HVAC support features. The steel framing of the structure is anchored to cast-in-place concrete pads.

Any dry remnants found in the bottom hopper or on horizontal surfaces of the tank interior will be manually removed, containerized, and transferred to the existing salt cementation process or to an off-Site vendor for disposal of residual sludges and solids. It is expected that F-801 and D-807 will require no interior treatment.

Transite panels on the second-story penthouse will be removed under an asbestos abatement permit. Removed panels will be wrapped and placed into appropriate containers for off-Site disposal as non-friable ACM. Painted transite will require an evaluation for the presence of lead-based paint. If the lead-based painted transite matrix fails to the meet the requirements for debris suitable for disposal as solid waste, the material will be managed as hazardous waste and will likely be transported to an off-Site TSD facility for encapsulation and burial.

Once the transite paneling has been removed, F-801 and D-807, piping, electrical conduit, ducting, controls, and instrumentation will be removed for disposition as recyclable, or for scrap. The tank will be detached from the concrete slab and lifted intact onto a suitable flatbed or low-boy trailer, and then transferred as SCO RCRA hazardous waste at an approved disposal facility. The steel framework and concrete slab will be demolished using a tracked excavator equipped with a hydraulic shear/grapple. All steel framing will be transferred off Site for recycling. Insulating materials, along with other incidental non-recyclable items, will be disposed as solid waste at a permitted off-Site sanitary landfill.

The concrete pads will be removed for recycling. Underground utilities in the area will be cut and capped within the concrete pad footprint, and the depressions will be back-filled and graded to match immediately adjacent elevations and conditions.

4.5.5 Demolition of Structures and Appurtenances Specific to Building 371/374

Once the majority of the outbuildings have been dispositioned, the structures and appurtenances associated with Building 371 and Building 374, but independent of the main production floor space of Building 371 will be demolished. The objective is to remove structures that do not allow unrestricted access to the main building. These structures include, but are not limited to: Building 374 Waste Treatment Operations, Building 371 Support Facility (offices, shops, and cafeteria that act as the transition between Building 371 and Building 374, and that occupy the south side of Building 371), and the Building 371 Switch House and Switch Yard located on the north side of Building 371. Removal of these features will allow access to structural concrete partition walls separating the production area of Building 371 from Building 374 to the east, and from the support facility to the south. In the event surface voids are created when these features are removed, the voids will be backfilled before continuing decommissioning activities in the affected areas.

Building 374, Waste Treatment Operations Structure, was constructed along the East Side of the Building 371 Support Facility. It is constructed of conventional structural steel framing (i.e., vertical

columns and roof beams) with portions of the east, north, and south exterior walls faced with pre-cast concrete tilt-up panels. The remaining exterior wall treatment is primarily painted structural concrete block. The structural framing system attaches to the West Side cast-in place concrete wall of the Building 371 Support Facility. The roofing system is a cast-in place concrete deck covered with 2-inch rigid insulation and a built-up membrane. The East Side loading dock area is a light steel-frame design with an interior metal cladding, and built-up roofing structure supported by open-web steel bar joists.

Floor treatments range from exposed sealed concrete slab, to vinyl composition tile, to glued-down carpet. Interior partition walls are a mix painted concrete block and standard metal-stud walls faced with gypsum board. There is also extensive suspended acoustic ceiling treatment throughout the office portions of the building and evidence of extensive transite paneling on interior walls of the active mechanical and equipment rooms.

It is anticipated that initial conditions for this portion of the Building 371/374 structure will be unrestricted released construction materials and equipment items left in place in Building 374 after the decontamination and stripout phase of the project has been completed, to include: interior partition walls, dropped ceiling systems, kitchen equipment, non-process and utility piping and materials, doors, windows, etc. It is planned that some of these remaining items will be suitable for reuse or for recycle, and as such will be selectively dismantled and removed. Additionally, it is also anticipated that the large tanks from Building 374 will be classified as SCO for disposal purposes, and will be allowed to remain in place until they can be removed intact, to be shipped whole to NTS or other approved disposal facility. This list of tanks includes, but is not limited to Tanks D-801 A-C, Tanks D-802 A-C, D-804 A-D, and D-811A and B in Room 2804; Tanks D-826 A-C, Tank D-823 in Room 3805; and Tank D-819 in Room 2804.

The general approach for the demolition of Building 374, will be to work to the west, beginning at the East Side loading dock. The loading dock/ground floor slab will be used as the working surface for moving materials and as a stable surface for staging large demolition equipment. Initial tasks will be focused on the removal of items for recycle (e.g., HVAC equipment, electrical switchgear) and those construction materials and systems easily removed for recycling (e.g. stripping of large power conduits for copper cable). These materials will be moved to the east side loading dock area to be placed into staged debris containers, or to be transported off Site for recycle.

With the building stripped of recyclable items, electrical systems will be isolated from areas still requiring power, and engineered openings will be cut into the roof system of Building 374. The roof system is basically a heavy steel frame supporting a cast-in-place concrete roof deck covered with a high-density polyethylene (HDPE) membrane. The building framing is basically a nominal grid of 30-foot (east west) by 22½-foot (north-south) bays. With this in mind, appropriate sections of the roof decking and membrane system may be cut with a saw and lifted vertically, leaving the structural steel framing intact beneath. With the decking removed, access to the tops of the tanks will be reasonably unrestricted, and the tanks may be lifted intact through the roof openings, laid out horizontally on the asphalt apron outside of the building, re-slung to be picked for loading, and then loaded onto flatbed or low-boy trailers appropriately configured for the size and weight of a given tank. These tanks will then be shipped intact to the NTS or other approved disposal facility.

With all tanks removed from the building, tracked excavators equipped with hydraulic shear attachments will proceed west across the ground floor slab removing and sizing all building components that remain. The excavators will also segregate the debris to the best extent possible as they turn and move it to awaiting debris or recycle material containers. Initially, these containers will be placed onto the asphalt apron to the east and south of the building. As demolition progresses and floor space on the main slab becomes free, a ramp will be built up to the main floor elevation, and waste containers will be placed directly onto the main concrete slab.

As materials are cut and plucked from the building structure, the materials will be swung behind the excavator for segregation into appropriate debris streams (e.g., concrete for on-Site recycling, steel for off-Site recycling), and further size reduction, as necessary. As additional floor space on the ground floor slab becomes available, additional material processing equipment may be placed on the slab to facilitate the segregation and sizing operation. This approach will require a structural evaluation to guarantee full support of the weight of the excavator/shear attachment, as well as other demolition support equipment. If a conflict arises regarding floor loading, steel plates may be placed on the slab to distribute the load of demolition equipment.

It is anticipated that the materials remaining after completion of decontamination activities will be suitable for unrestricted release and will not require additional screening before being loaded into containers for disposition. Consequently, material will be loaded as soon as possible, with containers leaving the Site immediately upon being filled. It is anticipated that debris materials will not be staged on Site, with shipping containers and/or appropriate trucking available to match the production rate of debris. A possible exception to this staging protocol could be the installation of a temporary concrete crusher at the demolition site. For the Building 374 structure alone, concrete materials suitable for processing into backfill material will come from the roof structure, all exterior pre cast double-T walls, interior cast-in-place walls, and the floor slab. With this significant amount of concrete rubble suitable for backfill to be generated during this project, there would be a significant cost saving realized by not transporting the concrete to a centralized processing area, and then transporting it back for backfilling purposes.

The **Building 371 Support Facility** was constructed along the south side of Building 371 after completion of the main Building 371 production areas. It is constructed of conventional structural steel framing (vertical columns and roof beams) with the east, west, and south exterior walls faced with pre-cast concrete tilt-up panels. The roofing system is a cast-in-place concrete deck covered with 2-inch rigid insulation and a built-up membrane. Interior partition walls are painted concrete block or standard metal-stud walls faced with gypsum board. Floor treatments range from exposed sealed concrete slab, to vinyl composition tile, to glued-down carpet.

There is a decorative fascia applied to the exterior walls that contains a cement asbestos facing product applied to ¾-inch exterior plywood. This fascia will require a permitted abatement action before proceeding with demolition. This material will likely be considered a friable ACM product to be scraped off, thereby requiring a full containment to be implemented. It may be possible to remove the asbestos facing and plywood backer together, but that will require detailed evaluation.

The approach for the demolition of the support facility will mimic that of the Building 374 structure. Upon completion of the asbestos abatement and after isolating the area electrically, demolition will begin along the south wall of the facility. A stripout task similar to that described for Building 374 will be performed, removing recyclable items such as lockers, cafeteria equipment, electrical switchgear, and HVAC equipment. Debris will be loaded directly into staged disposal or transport containers.

The **Building 371 Electrical Switch House and Switchyard** were constructed as a part of the original structure. The Switch House contains the emergency generator and throw-over switchgear. There is also an exterior transformer yard housing four step-down transformers that receive electricity from the substation located due east of Building 374, through underground duct banks.

The Switchyard has four separate transformers mounted on cast-in-place concrete pads. There are also concrete walls placed to separate each of the four transformers, isolating them from possible damage caused by explosion of an adjacent unit. The transformers are all placarded as being PCB-free. Power leaves the transformers through an overhead bus duct and enters the north wall of the Switch House.

The Switch House consists of a single-story addition attached to the north side of the main Building 371 production floor, and was constructed of cast-in-place concrete walls, with a steel framed roof support structure covered by a cast-in-place concrete deck and built-up roof membrane. It is approximately 40 feet wide by 160 feet long.

The fence surrounding the Switchyard currently displays notifications indicating the potential for environmental impacts in this area. The first step in the demolition of this area will be for ER personnel to perform an investigation of the soils within the Switchyard to identify all areas of soils potentially impacted by past practices. If possible, any impacted soil should be removed early to minimize spread of environmental problems during all demolition tasks, and to allow for complete Site closure once the main Building 371 structure has been razed. Once all impacted soils have been identified, isolated, and possibly removed, and all equipment isolated electrically, the switchgear will be lifted from within the Switchyard and shipped off Site for recycle. The security fence surrounding the area will also be removed to facilitate access to the equipment to be removed from the Switch House. An underground duct bank system provides the conduit space for the high-voltage cables that feed Building 371. The cabling will be stripped from these duct banks for off-Site recycling, and the duct banks will be capped at both ends and abandoned-in-place.

To the extent possible, all switchgear and breakers will be removed from the Switch House with the structure remaining intact. Once all equipment that can be removed through existing doors is out, an opening will be created in the walls or roof in order to access the emergency generator. The generator will then be lifted out of the building, along with any remaining large switchgear and electrical equipment, and shipped off Site for reuse.

With all equipment removed, the structure will then be demolished. Before removal, the concrete slab and equipment mounting pedestals will be inspected for staining indicative of past oil spilling. If staining is evident, the concrete will require characterization before removal. As described for all other removals, concrete debris will be used as clean backfill material, metal will be sent off Site for recycling purposes, and remaining construction materials will be direct loaded as solid waste suitable for off-Site disposal in a permitted sanitary landfill. The final step will be to grade the entire Switch Yard/Switch House area to match adjacent elevations and conditions.

4.5.6 Demolition of the Main Portion of Building 371

As described below, techniques used to demolish the main portion of the Building 371 structure will differ from those used to demolish the other buildings within the Building 371/374 Closure Project.

Building 371 is a four-level, partially buried structure constructed of reinforced concrete. Even with prior partial removal of Building 374 and the Building 371 Support Facility, the building will still encompass approximately 150,000 ft^2 of floor space. The building construction was hardened to withstand the forces imposed by a design-basis earthquake or tornado. The hardened construction includes the exterior walls and roof, those parts of the building where plutonium recovery operations were conducted, and portions of the building that housed equipment or systems essential to the plutonium recovery processes or were necessary to contain plutonium within the building. Aspects of the hardened construction that will affect facility demolition activities include:

- Quantities of reinforcing steel beyond standard American Concrete Institute (ACI) requirements,
- Cast-in-place concrete interior partition walls versus typical concrete block or metal-stud and drywall partition systems,
- Cast-in-place concrete framing and floor slab system versus steel framing components,
- Concrete wall and slab thickness beyond typical industrial use/code requirements,
- An extensive foundation of concrete caissons up to 6 feet in diameter, drilled into bedrock,
- Two full operational levels below the ground floor slab and one above the slab,
- A basement located approximately 20 feet below the ground floor slab, and
- A sub-basement located 20 feet below the basement.

These factors, combined with the numerous vaults and canyons within the main portion of the structure, result in a complex, extremely strong and rigid building that will be resistant to most demolition methods. Consequently, the planned approach for demolition of the main portion of Building 371 includes the use of explosives.

Placement of explosives in an engineered, controlled fashion while the structure is still sound will minimize risks to personnel and equipment. In addition, the use of explosives will be enhanced by the beneficial effects of gravity, eliminating the need to move large quantities of soil away from the building walls. The roof structure and exterior walls will likely not require any explosive actions to initiate collapse, relying solely on gravity to bring them down into the sub-basement void. This will provide a protective shell that will contain any projectiles issued from the interior blasts.

In accordance with the *RSOP for Facility Disposition*, the use of explosives will be evaluated for its effects on worker health and safety and the environment, and for its cost-effectiveness, as compared to mechanical demolition techniques. Site personnel, the LRA, SRA, stakeholders, and the explosives contractor will be involved in the evaluation process. Given the structural aspects of Building 371, the use of explosives seems to be the preferred demolition method because it will provide the safest and most cost-effective means of removing the facility. The proposed method for implosion should also minimize adverse environmental effects.

The actual sequence of demolition activities will be delineated in the Demolition Plan; the general sequence of demolition activities for the main portion of the Building 371 structure will proceed as follows:

1) Upon completion of pre-demolition activities, the selected demolition contractor will begin preparations for collapse of the building. Following the engineered Demolition Plan, as required by the *RSOP for Facility Disposition*, the demolition crew will drill into various structural members and essential connections to place calculated charges. Charges may also be wrapped around a structural member, such as a column base, depending on the size of the member and the action of the specific charge. Blast mats and/or chain link fencing will be wrapped around charges located near uncovered openings of the building to control projectiles from being ejected from the building.

2) With charges in place and the appropriate protection of any contaminated concrete left in place, an explosion sequence will be initiated, to move upward and outward through the basement, ground floor, and mezzanine structures, creating a void into which the walls and supporting columns will collapse. As the connections for interior structural framing elements are removed by the explosives and fall into the basement and sub basement, the exterior walls and roof structure will collapse onto the top of the rubble pile created by the collapsed interior structures. Charges will only be placed in portions of the structure that meet the unrestricted release criteria.

3) Final placement of concrete in the basement of the main portion of Building 371 will be completed in accordance with Section 5.4 Waste Minimization and Recycling.

4) Permanent run-on/run-off controls and/or erosion controls will be installed or, if appropriate, existing, temporary controls will be stabilized. In addition, the area will be cleaned of trash and miscellaneous debris, and the demolition crew will be demobilized.

Backfill operations will be conducted by decommissioning and details on the activity will be contained in work packages. The requirements for the backfill activity are based on the groundwater modeling and land configuration to provide a relatively stable surface suitable for a wildlife refuge. The groundwater modeling to support decommissioning indicates that B371/374 does not have any adverse impacts on groundwater and recommends that openings not be made in the South side of the building and the foundation drains be disrupted. Backfill operations may involve soil, recycled concrete and/or flowable fill. Section 5.4 contains additional details on the potential back-filling methods.

4.5.7 Under Building Characterization

Characterization of the Building 371 (IHSS Group 300-3) and Building 374 (IHSS Group 300-4) potential under building contamination (UBC) was conducted in 2003 using the methodologies described in the Industrial Area Sampling and Analysis Plan (IASAP) for the Rocky Flats Environmental Technology Site (RFETS) (DOE, 2001).

The sampling approach was described in IASAP Addendum IA-03-01 (DOE, 2002). The approach consisted of collecting samples from locations based on a statistical grid and collecting biased samples in additional areas where UBC was most likely to occur, such as at utility drains or where other pathways to the underlying soil were present.

Twenty-nine locations were sampled beneath the Building 371 slab for the interval 0-0.5 feet. Samples were analyzed for radionuclides, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) and metals.

Eighteen locations were sampled beneath the Building 374 slab. Seven locations were sampled for the interval 0 0.5 feet to investigate potential contamination under the slab; ten were sampled for the interval 2.5 to 4.5 feet to investigate utility drains; and one sample was collected at a depth of 4.5 to 6.5 feet to investigate the new process waste line. All samples were analyzed for radionuclides, VOCs, SVOCs and metals.

The sample results show only one exceedance of the wildlife refuge worker action levels (WRW AL). At this location, on the far east side of Building 374, an arsenic concentration of 23.0 mg/kg slightly exceeds the WRW AL of 22.2 mg/kg. This arsenic value is within the range of other arsenic values on Site that are considered background concentrations.

Two additional locations had exceedances of the ecological action levels. At two locations under Building 371, lead exceeded the ecological action level of 25.6 mg/kg. At one location in the center of the building, the lead concentration was 26.2 mg/kg. At the other location near the north wall of Building 371, the lead concentration was 90.6 mg/kg. Based on the depth, these soils are not a risk and no action is required.

Analytical results are summarized in the Data Summary Report, IHSS Groups 300-3 and 300-4, UBC 371 and 374 (DOE, 2003). Based on the recent investigations, agreement was reached with the regulators on a No Further Accelerated Action decision for IHSS Groups 300-3 and 300-4 on August 21, 2003.

4.5.8 Project Cleanup, Demobilization, and Post-Demolition

The final task to be completed by the decommissioning contractor is to perform any backfill and compaction necessary to render the site safe for personnel involved in follow-on site closure actions. These backfilling operations would be limited to filling basement level openings, and providing fill material against walls to be abandoned in place to ensure they are fully stabilized. Final site backfill, re-grading, and site restoration will be conducted during the final Site remediation/restoration. The decommissioning contractor shall also be required to install final, or stabilize existing, temporary run-on/run-off controls or erosion controls. The decommissioning contractor shall then clean up the site for trash and miscellaneous debris, and demobilize.

The B371 groundwater modeling was conducted to assess the affect on groundwater of leaving the structure in place; in addition to assessing potential and existing groundwater contamination in the area. This model indicates that leaving the building in place does not have any adverse impacts on groundwater and recommends that openings not be made in the South side of the building and the foundation drains be disrupted.

Demolition will remove the building structures to at least 3 feet below expected final grade. Concrete between 3 and 6 feet below the surface will meet the decontamination requirements for unrestricted release. The remaining portions of the building deeper than 6 feet below the surface will have some plutonium and americium contamination less than 7 nCi/g in some portions of the concrete. The less than 7 nCi/g is determined by averaging the remaining surface contamination over just the first 7 inches of concrete. These remaining portions of the building will be from 6 to 45 feet below the final surface grade.

The backfill of the remaining building and soil covering will be compacted, graded and seeded to produce surface vegetation that will be designed for surface stability of the final slope. If there is a substantial delay between the grading effort and the final seeding, measures will be taken to minimize erosion during the delay. Temporary measures could include interim vegetation, erosion control mats, application of surfactant and/or crimping the area with straw.

Near-term recommendations upon completion of the actions in this area include the following:

- Excavation at and in proximity to the site will continue to be controlled through the Site Soil Disturbance Permit process;
- The planning for and conduct of accelerated actions in proximity to this area will consider and employ appropriate erosion controls during the conduct of these actions;
- Drilling for and/or pumping of groundwater (except for sampling, removal of groundwater infiltration from excavations and characterization purposes) will be prohibited;
- During the vegetation period, appropriate surface water run off controls will be taken to prevent surface erosion;
- Monitoring and inspection of the area for indications of erosion will be conducted and appropriate measures taken to correct any occurrences;
- Fencing and signs restricting access will be posted to minimize disturbance to newly-vegetated areas; and
- These controls will remain in place pending implementation of long-term controls.

These near term recommendations will be reevaluated in subsequent close out reports for all actions taken in this area. Based on remaining environmental conditions after the final grading and successful vegetation of the area, institutional controls that will be used as appropriate for this area include the following:

- Prohibitions on construction of buildings in the IA;
- Restrictions on excavation or other soil disturbance; and
- Prohibitions on groundwater pumping in the area.

No specific engineered controls are recommended. Periodic walkdown inspections of the area for indications of erosion or seeps and slope stability conditions will be conducted. No specific environmental monitoring is recommended as a result of the remaining concrete in the subsurface; however, the IMP process will be used for future evaluation and monitoring if needed. No specific physical controls, such as fences are recommended. This area will be evaluated as part of the Comprehensive Risk Assessment, which is part of the RCRA Facility Investigation/Remedial Investigation (RFI/RI) and Corrective Measures Study/Feasibility Study (CMS/FS) that will be conducted for the Site. The need for and extent of any, more general, long-term stewardship activities will also be analyzed in RFI/RI and CMS/FS and will be proposed as part of the preferred alternative in the Proposed Plan for the Site. Institutional controls and other long-term stewardship requirements for Rocky Flats will ultimately be contained in the Corrective Action Decision/Record of Decision and as further described in RFCA Attachment 5, Section 1.2.

5.0 WASTE MANAGEMENT

The *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities* and the *RSOP for Facility Disposition* describe the various waste types that will be generated during the Building 371/374 Closure Project. Waste estimates for these and other RFETS Closure Project activities are reported in the *Waste Generation, Inventory, and Shipping Forecast*, which includes projections for waste volumes to be generated, stored, and shipped from the Site in each fiscal year. Table 7 provides the current estimate of the types and volumes of remediation waste and recyclable materials that will be generated during the Building 371/374 Closure Project. Remediation waste will be managed in accordance with the ARARs described in Section 7.0 of this DOP, and with the remediation waste management requirements described in a Building 371/374 Operations Order, which will be prepared prior to the initiation of decommissioning activities.

5.1 Management Requirements for Compliance Order Wastes

The Site's inventories of idle equipment containing hazardous materials inventory, mixed residues contained in tank systems, and certain mixed wastes for which there is no current disposal path are governed by the terms and conditions of compliance orders on consent. The following paragraphs describe the management requirements for these wastes.

5.1.1 Idle Equipment Containing Hazardous Materials Inventory

Idle equipment containing hazardous materials is managed under the Idle Equipment and Hazardous Waste Tank Compliance Order on Consent and associated Idle Equipment Management Plan.[18] Table 8 contains a list of the currently identified equipment in the Building 371/374 Closure Project. Some of this equipment may be dispositioned during deactivation and additional pieces of equipment may be identified during deactivation and/or decommissioning. An up-to-date list will be maintained in the Building 371/374 Closure Project Files.

Both existing and newly identified idle equipment containing hazardous materials will be managed as follows:

- The idle equipment will be locked out/tagged out at the entry and exit points.
- The idle equipment will be subject to the following posting requirements:
  - Hazard Category 1, 2, and 3 equipment will be posted with a sign or tag, stating the following: *"This idle equipment contains material that, if released, could affect worker safety or the environment. Report any spillage to supervision immediately."*
  - Hazard Category 4 equipment will not be posted.
- The idle equipment will be subject to the following inspection requirements:
  - Hazard Category 1 equipment will be inspected monthly.
  - Hazard Category 2 equipment will be inspected bi-monthly.
  - Hazard Categories 3 and 4 equipment will not be inspected.

[18] Idle Equipment and Hazardous Waste Tanks Compliance Order on Consent (97-08-21-01), including the RFETS Idle Equipment Management Plan (latest revision)

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Table 7. Building 371/374 Closure Project Waste & Recyclable Material Estimates

Category	Sub-Category	Volume[a]	Proposed Destination
Rad-Regulated			
Transuranic (TRU)	TRU	2,096 m^3	WIPP
	TRU Mixed (TRM)	398 m^3	WIPP
	Residues	4 m^3	WIPP
	TRU/TRM Liquids	< 1 m^3	TBD[d]
Low Level (LL)	LL - Including Asbestos	3,631 m^3	TSD[b]
	LL - Structural Debris	4,103 m^3	TSD[b]
	LL - Surface Contaminated Objects (SCO)	17,885 m^3	TSD[b]
	LL - Contaminated Recycle Metal	<1 m^3	TBD[d]
	LL - Liquids	<1 m^3	TBD[d]
	LL - PCBs	3 m^3	TSD[b]
Low-Level Mixed (LLM)	LLM - RCRA solids	146 m^3	TSD[b, c]
	LLM - RCRA liquids	4 m^3	TSD[b, c]
Non-Rad Regulated			
Hazardous/Toxic	RCRA	7 m^3	TSD[b]
	CERCLA	<1 m^3	TSD[b]
	PCBs	12 m^3	TSD[b]
	RCRA/CERCLA Liquids	<1 m^3	TSD[b]
Sanitary	Routine Sanitary	<1 ton	Sanitary landfill
	Non-Routine Sanitary	10,452 tons	Sanitary landfill
	Rubble/Structural Construction Debris	<1 ton	TBD[d]
	Friable Asbestos	21 m^3	TSD[b]
	Non-Friable Asbestos	39 tons	Sanitary landfill
Material for Recycle	Salvage/PU&D	<1 m^3	Vendor
	Rubble/Structural Construction Debris	28,020 tons	Recycled on Site
	Radiological Test/Calibration Sources	<1 m^3	TBD[d]
	Non-Construction Scrap Metal/Recycle	<1 m^3	TBD[d]

[a] Waste estimates are based on best available information. This table is for information purposes only and will not be revised as estimates are updated. Waste estimates include demolished structures.

[b] The RFETS Environmental Home Page (http://rfetshp/environmental/) contains a list of currently authorized treatment, storage, and disposal (TSD) facilities. Facilities are selected by the contractor based on periodic environmental audits, which are conducted in accordance with the Off-Site Waste Management Program (1-MAN-037-OWMP, latest revision) and documented in Off-Site Waste Management Facility Use Decisions (FUDs).

[c] Assumed to include on-Site treatment facilities (e.g., RCRA Unit 374.3)

[d] *Destination to be determined*

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Table 8. Building 371/374 Idle Equipment with Hazardous Materials Inventory

Location	Idle Equipment Number	Set	Description	Material	Rad-Contaminated ?	Haz Cat	Quantity
Rm. 1117	371-0008	12	Wash Liquid Pump 31-17, P-182, from D170 to D172	nitric acid	Yes	4	< 1 pint
Rm. 1117	371-0009	12	HSA Waste Pump 34-04, P4B, Tank D4B from E9, T10 to 2, D811	potassium hydroxide	Yes	4	< 1 pint
Rm. 1117	371-0010	12	HSA Waste Pump 34-04, P3A, Tank D3A, from E1, E80 to D811	potassium hydroxide	Yes	4	< 1 pint
Rm. 1117	371-0011	12	HSA Waste Pump 34-04, P3B, Tank D3B, from E1, E80 to D811	potassium hydroxide	Yes	4	< 1 pint
Rm. 1117	371-0012	12	HSA Waste Pump 34-04, P4A, Tank D4A, from E9-E10 to D2, D811	potassium hydroxide	Yes	4	< 1 pint
Rm. 3521	371-0055	16	Tank D-70	corrosive liquid	Yes	4	operation -ally empty
Rm. 3545	371-0067	6	Spent Resin Transfer Pump 31-11, P-18	water, .35N nitric acid, and resin	Yes	4	< 1 pint
Rm. 3553	371-0068	6	Evaporator 31-14, P-60A, P-66A	7.5N nitric acid and hydrogen peroxide	Yes	4	< 1 pint
Rm. 3553	371-0069	6	Evaporator Pump 31-14, P 60B, P 66B	7.5N nitric acid and hydrogen peroxide	Yes	4	< 1 pint
Rm. 3559	371-0072	6	Additives Measuring Tank 31-11, D-63A	iron sulfate, aluminum nitrate, sodium	Yes	2	operation -ally empty
Rm. 3559	371-0073	6	Additives Measuring Tank 31-11, D-63B	iron sulfate, aluminum nitrate, sodium	Yes	2	operation -ally empty
Rm. 3563	371-0075	6	Additives Measuring Tank 31-11, D-57A	iron sulfate, aluminum nitrate, sodium	Yes	2	operation -ally empty
Rm. 3563	371-0076	6	Additives Measuring Tank 31-11, D-57B	iron sulfate, aluminum nitrate, plutonium	Yes	2	operation -ally empty

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Table 8. Building 371/374 Idle Equipment with Hazardous Materials Inventory

Location	Idle Equipment Number	Set	Description	Material	Rad-Contaminated ?	Haz Cat	Quantity
Rm. 3563	371-0077	6	Additives Measuring Tank 31-11, D-57C	iron sulfate, aluminum nitrate, plutonium	Yes	2	operation -ally empty
Rm. 3563	371-0078	6	Additives Measuring Tank 31-11, D-57D	iron sulfate, aluminum nitrate, plutonium	Yes	2	operation -ally empty
Rm. 3523	371-0104	16	Tanks T-23A, B, C, D	corrosive	Yes	4	operation -ally empty
Rm. 3545	371-0108	6	Pumps P-30A, P-30B, P-32A, P-32B	corrosive, caustic solution	Yes	4	< 1 pint
Rm. 1105	371-0112	11	Pumps P-83A, P-83B, P-122A, P-122B, P-123A, P-123B, P-125A, P-125B, P-126A, P-126B	corrosive, caustic solution	Yes	4	< 1 pint
Rm. 1115	371-0113	12	Pumps P-140, P-141A, P-141B	corrosive, caustic solution	Yes	4	< 1 pint
Rm. 1117	371-0114	12	Pumps P-181 and P-182	corrosive, caustic solution	Yes	4	< 1 pint
Rm. 1125	371-0115	12	Pumps P-5A, P-5B, P-6A, P-6B, P-7A, P-7B, P-15A, P-15B, P-27A, P-27B, P-107A, P-107B, P-108A, P-108B	corrosive, caustic solution	Yes	4	< 1 pint
Rm. 2307	371-0117	13	Pumps P-21A, P-914	corrosive, caustic solution	Yes	4	< 1 pint
Rm. 3206	371-0121	8	Pumps P-10, P-11, P-12, P-13, P-41	corrosive, caustic solution	Yes	4	< 1 pint

- Inspections will be conducted by RCRA-qualified inspectors, who will ensure the equipment is posted, in good condition, and not leaking. Inspectors will document their inspections in an inspection log, noting any required corrective measures.
- The equipment will be drained and removed according to the schedule established for the applicable Dismantlement Set.
- The equipment will be drained to the point of being empty. For surfaces of the equipment that are visible and readily accessible, the affected surfaces (i.e., surfaces that may have come into contact with hazardous waste) will be cleaned or wiped visually clean (i.e., no oily surface or

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sheen) to satisfy the RCRA definition of a "clean debris surface."[19] In the event the clean debris surface standard cannot be met, the equipment will be cleaned or wiped down to remove as much removable contamination as reasonably possible, with the objective of eliminating significant risk from the remaining residuals.

- The hazardous waste will be characterized in accordance with 6 CCR 1007-3, Part 262.11. Sampling methods, if used, will comply with those listed in Appendix I of 6 CCR 1007-3, Part 261. Analytical test methods, if used, will comply with those instructions contained in EPA Manual SW-846 and applicable RFETS laboratory procedures.
- When empty, the equipment will be characterized and managed in accordance with the applicable ARARs.

In accordance with ¶62 of the Idle Equipment and Hazardous Waste Tank Compliance Order on Consent, the order is hereby terminated as to each piece of idle equipment located in Building 371.

5.1.2 Mixed Residues

Residues are plutonium-contaminated liquids and solids that were once held in reserve at RFETS, because they potentially contained plutonium in sufficient quantities to warrant treatment for recovery of nuclear material. Building 371 has an existing inventory of residues and residues mixed with hazardous waste, which are being treated and/or repackaged in preparation for shipment to WIPP. Building 374 does not contain any mixed residue tanks. The mixed residue tank units located within Building 371 are listed in Table 9

Table 9. Building 371 Mixed Residue Tank Units

Room #	Set#	RCRA Unit #	Tank #	Tank Type	Contents
1107	12	N/A	D44A1	pencil	nitric acid, plutonium
1107	12	N/A	D44A2	pencil	nitric acid, plutonium
1107	12	N/A	D44A4	pencil	nitric acid, plutonium
1107	12	N/A	D44A5	pencil	nitric acid, plutonium
1107	12	N/A	D44A6	pencil	nitric acid, plutonium
1107	12	N/A	D44B1	pencil	nitric acid, plutonium
1107	12	N/A	D44B2	pencil	nitric acid, plutonium
1107	12	N/A	D44B4	pencil	nitric acid, plutonium
1107	12	N/A	D44B5	pencil	nitric acid, plutonium
1107	12	N/A	D44B6	pencil	nitric acid, plutonium
1109	12	N/A	D43A1	pencil	nitric acid, plutonium
1109	12	N/A	D43A2	pencil	nitric acid, plutonium
1109	12	N/A	D43A3	pencil	nitric acid, plutonium

[19] A "clean debris surface" is defined as "a surface that, when viewed without magnification, is free of all visible contaminated soil or hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided such staining and soil and waste in cracks, crevices, and pits is limited to no more than 5% of each square inch of surface area." (6 CCR 1007-3, Section 268.45)

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Table 9. Building 371 Mixed Residue Tank Units

Room #	Set#	RCRA Unit #	Tank #	Tank Type	Contents
1109	12	N/A	D43A4	pencil	nitric acid, plutonium
1109	12	N/A	D43A5	pencil	nitric acid, plutonium
1109	12	N/A	D43B1	pencil	nitric acid, plutonium
1109	12	N/A	D43B2	pencil	nitric acid, plutonium
1109	12	N/A	D43B3	pencil	nitric acid, plutonium
1109	12	N/A	D43B4	pencil	nitric acid, plutonium
1109	12	N/A	D43B5	pencil	nitric acid, plutonium
1115	12	91.008	D160A	raschig ring removed	potassium hydroxide, plutonium
1115	12	91.009	D160B	raschig ring removed	potassium hydroxide, plutonium
1115	12	N/A	D400B	raschig ring removed	caustic, nitric acid
1115	12	N/A	D400C	raschig ring removed	caustic, nitric acid
1115	12	N/A	D179	raschig ring removed	nitric acid, potassium hydroxide, plutonium
1117	12	91.010	D2A	raschig ring removed	caustic, plutonium
1117	12	91.011	D2B	raschig ring removed	caustic, plutonium
1117	12	N/A	D170	pencil	nitric acid, plutonium
1117	12	N/A	D171	pencil	nitric acid, plutonium
1117	12	N/A	D157A	raschig ring removed	potassium hydroxide, plutonium
1117	12	N/A	D157B	raschig ring removed	potassium hydroxide, plutonium
1127	12	91.012	D293A	raschig ring removed	nitric acid, hydrochloric acid, potassium hydroxide, plutonium
1127	12	91.013	D293B	raschig ring removed	nitric acid, hydrochloric acid, potassium hydroxide, plutonium
2223	15	91.014	D934A	raschig ring removed	nitric acid, hydrochloric acid, plutonium
2223	15	91.015	D934B	raschig ring removed	nitric acid, hydrochloric acid, plutonium
3549	6	N/A	D173A	pencil	nitric acid, plutonium
3549	6	N/A	D173B	pencil	nitric acid, plutonium
3549	6	N/A	D68A	pencil	nitric acid, potassium hydroxide, plutonium
3549	6	N/A	D68B	pencil	nitric acid, potassium hydroxide, plutonium
3549	6	N/A	T-6A	pencil	nitric acid, plutonium
3549	6	N/A	T-6B	pencil	nitric acid, plutonium
3549	6	N/A	T-6C	pencil	nitric acid, plutonium
3549	6	N/A	T-6D	pencil	nitric acid, plutonium

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Table 9. Building 371 Mixed Residue Tank Units

Room #	Set#	RCRA Unit #	Tank #	Tank Type	Contents
3549	6	N/A	T-7A	pencil	nitric acid, plutonium
3549	6	N/A	T-7B	pencil	nitric acid, plutonium
3549	6	N/A	T-7C	pencil	nitric acid, plutonium
3549	6	N/A	T-7D	pencil	nitric acid, plutonium
3549	6	N/A	T-9A	pencil	nitric acid, plutonium
3549	6	N/A	T-9B	pencil	nitric acid, plutonium
3553	6	N/A	D72A	pencil	nitric acid, plutonium
3553	6	N/A	D72B	pencil	nitric acid, plutonium
3553	6	N/A	D66A	pencil	nitric acid, potassium hydroxide, plutonium
3553	6	N/A	D66B	pencil	nitric acid, potassium hydroxide, plutonium
3559	6	N/A	D50A	raschig ring removed	nitric acid, plutonium
3559	6	N/A	D50B	raschig ring removed	nitric acid, plutonium
3559	6	N/A	D51A	raschig ring removed	nitric acid, plutonium
3559	6	N/A	D51B	raschig ring removed	nitric acid, plutonium
3559	6	91.039	D55A	raschig ring removed	nitric acid, plutonium
3559	6	91.040	D55B	raschig ring removed	nitric acid, plutonium
3559	6	N/A	D59	raschig ring removed	nitric acid, plutonium
3559	6	N/A	D69A	raschig ring removed	nitric acid, plutonium
3559	6	N/A	D69B	raschig ring removed	nitric acid, plutonium
3559	6	N/A	D69C	raschig ring removed	nitric acid, plutonium
3563	6	N/A	D49A	raschig ring removed	nitric acid, plutonium
3563	6	91.041	D49B	raschig ring removed	nitric acid, plutonium
3563	6	91.042	D49C	raschig ring removed	nitric acid, plutonium
3563	6	91.043	D49D	raschig ring removed	nitric acid, plutonium
3563	6	N/A	D52A	raschig ring removed	nitric acid recycled solution
3563	6	N/A	D52B	raschig ring removed	nitric acid recycled solution

The existing inventory of liquid mixed residues contained in tanks and ancillary equipment has been managed under the terms and conditions of the Mixed Residue Compliance Order on Consent.[20] As part of facility deactivation, these tanks were tapped and drained in 1999. The tanks are currently in a physically empty configuration and are inspected quarterly. In the event additional inventory is discovered in a tank during decommissioning, Building 371/374 facility management will develop an action plan to determine the source of the liquid, or schedule a sampling event or other appropriate action

[20] Mixed Residue Compliance Order on Consent (99-09-24-01), including the Mixed Residue Tank Plan.

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to make a hazardous waste determination. If appropriate, the action plan may include draining the liquid from the system. The Building 371/374 Closure Project Health and Safety Plan (HASP) contains pre-planning requirements for responses to possible releases from mixed residue tank systems. Pre-planning activities include identification of vital elements of the tank system, identification of locations of primary shut-off valves capable of isolating feed to a tank, and a pre-release plan, which specifies the recommended method to drain the tank system (e.g., hot tapping at a low spot, draining into bottles, or draining into another tank system). Facility operations personnel are trained to implement the pre-release plan and accompanying shut-off procedures. In the event of an actual release from a mixed residue tank system, the Site's RCRA Contingency Plan will be implemented.

In accordance with ¶66(i) of the Mixed Residue Compliance Order on Consent, the order is hereby terminated as to each of the mixed residue tanks located in Building 371.

5.1.3 Site Treatment Plan Wastes

The Compliance Order Requiring Compliance with the Site Treatment Plan (STP)[21] governs the management of certain mixed wastes for which there is no current treatment or disposal path. These wastes include LLM wastes with actinide activity levels between 10 and 100 nCi/g, and wastes containing hazardous constituents that are prohibited from land disposal under RCRA and the CHWA (i.e., land disposal restricted [LDR] wastes). The STP describes the development of treatment capacities and technologies for these wastes. Progress is tracked through the Annual Progress Report and Work Plan, and Quarterly Progress Update reports, which are submitted for review and approval by CDPHE. STP wastes are tracked on a Site-wide basis, by waste form. The current inventory of STP wastes includes combustibles, acids, lab solutions, filters, glass and ground glass, inorganic sludges, insulation, and salt brine.

5.2 Waste Treatment

Remediation waste generated during decommissioning may be treated in the Site's RCRA-permitted treatment units; under the generator treatment provisions of 6 CCR 1007-3, Part 100.21(d); under the debris rule standard identified in the 6 CCR 1007-3, Part 258.45; in temporary units established under the substantive requirements of 6 CCR 1007-3, Part 264.553, or under 40 CFR 300.

5.3 Waste Disposal

Wastes generated as a result of facility decommissioning activities will be packaged and characterized in compliance with RFETS waste management procedures[22], which implement treatment, storage, disposal facility WAC and DOT packaging requirements. Treatment, storage, and disposal facilities are selected by the contractor based on periodic environmental assessments of facilities offering the required waste management services. Assessments are performed in accordance with the requirements of the Off-Site Waste Management Program[23] and results are documented in Off-Site Waste Management Facility Use Decisions (FUDs).

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[21] Compliance Order Requiring Compliance with the Site Treatment Plan (95-10-03-01) was issued pursuant to the CHWA and RCRA, as amended by the Federal Facility Compliance Act, which required the development and submittal of a Site Treatment Plan for each facility at which DOE generates or stores mixed wastes.

[22] See the Building 371/374 Waste Stream and Residue Identification & Characterization (WSRIC), (latest revision); Waste Characterization, Generation, and Packaging (PRO-079-WGI-001), (latest revision); Solid Radioactive Waste Packaging (4-D99-WO-1100), (latest revision); and Non-Radioactive Waste Packaging (PRO-301-WP-1027/NONRAD), (latest revision).

[23] Off Site Waste Management Program (1-MAN-037-OWMP), (latest revision)

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Off-Site facilities accepting remediation waste from RFETS must meet the requirements of the CERCLA "off-site rule." The primary purpose of the "off-site rule" is to clarify and codify the CERCLA requirements to prevent waste generated from remediation activities conducted under a CERCLA action from contributing to present or future environmental problems at off-Site waste management facilities. Only facilities meeting EPA's acceptability criteria may be used for off Site management of remediation waste.

5.4 Waste Minimization and Recycling

Waste minimization and recycling will be integrated into the IWCP process and into the management of the remediation waste generated during decommissioning. Unnecessary generation of sanitary, hazardous, LL or LLM, TRU or TRM, and Toxic Substances Control Act (TSCA) waste will be controlled using work techniques that prevent the contamination of areas and equipment; preventing unnecessary packaging, tools, and equipment from entering radiological contaminated areas; and reusing contaminated tools and equipment when practical.

Standard decontamination operations and processes will be evaluated for waste minimization potential and suitable minimization techniques will be implemented. Property with radiological contamination or property containing hazardous materials may be reused or recycled on Site, off Site by other DOE facilities, or by publicly- or privately owned facilities having proper authorization to take possession of the property. Materials generated during decommissioning will be recycled based on availability of appropriate recycle technologies; availability of approved recycle facilities, and cost effectiveness. Table 10 describes the recycling options that will be considered for the Building 371/374 Closure Project.

Table 10. Material Recycling Options

Material	Recycle Option	Comments
"Clean" scrap metal (not radioactively contaminated and not considered hazardous in accordance with RCRA)	Recycle through approved scrap metal vendors or via contract.	Material must meet receiving facility's WAC and licensing requirements, if any.
Non-radioactive scrap metal contaminated with beryllium	Decontaminate and recycle through approved commercial facility.	Decontamination must meet the release criteria prescribed by 10 CFR 850.
Clean building rubble	Reuse on Site as backfill.	Must meet release criteria established in the *RSOP for Recycling Concrete*.
Clean wiring and other electrical components.	Recycle through approved commercial recycling facility.	Material must not exceed contamination types and levels identified in the receiving facility's WAC and license
Clean bulk plastics and glass	Recycle through approved commercial recycling facility.	Material must not exceed contamination types and levels identified in the receiving facility's WAC and license.
Used lead acid batteries	Recycle through approved commercial recycling facility.	Material must meet receiving facility's WAC and licensing requirements, if any
Used oil	Recycle through approved commercial fuel blending facility.	Material must meet receiving facility's WAC and licensing requirements, if any.

Structural rubble (i.e., concrete, meeting the unrestricted release criteria) will be reused as fill material as guided by the *RSOP for Recycling Concrete*. It will be verified that there is minimal reinforcing steel in the debris and the debris will be placed into depressions as backfill material. The debris will generally

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have two flat surfaces, and will not exceed thirty-two inches in thickness. If needed recycled concrete meeting the above requirements could come from other Site buildings or the stockpile. Layering the backfill would mean that a uniform layer of concrete debris would be placed in a thickness not to exceed two feet. Then a layer of soil or crushed concrete would be placed on top of the concrete, followed by a formal compaction effort to facilitate moving the concrete debris into a stable configuration, as well as forcing soil into void spaces between adjacent pieces of concrete. This layering would then continue to a point 3 feet below the anticipated final grade, with the final 3-foot lift of backfill being entirely soil. All concrete above six feet will meet the free-release criteria.

Implementing this approach could significantly decrease cost by eliminating the steps involved with loading and transporting debris to the PA stockpiling area, size reduction at that location, and loading and transportation back to a fill site.

In accordance with user guidelines from the US Department of Transportation and Bureau of Reclamation, a method specification is the typical standard for placement criteria for embankments and fills using coarser materials. A method specification is a standard placement process that results in a relatively uniform fill. With respect to the recycled concrete, the method specification will consist of placing the layers as indicated above, and compacting the layers with two to five passes of tracked equipment no less than 20,000 pounds and exerting a foot pressure not less than 6½ pounds per square inch. Water will be applied throughout the placement and compacting process to minimize dust and facilitate compaction. The criteria for the placement activity will be no visual deflection of the fill during the equipment pass.

6.0 CLOSURE OF RCRA-REGULATED UNITS

Appendix A lists the RCRA-regulated units for the Building 371/374 Closure Project. Appendix B provides associated unit-specific closure information, and Appendix C provides tank drawings.

6.1 Closure Options

RCRA-regulated units will be decontaminated and/or removed in compliance with the closure options described in *the RSOP for Facility Component Removal, Size Reduction, and Decommissioning Activities*.

6.2 Closure Schedule

All RCRA-regulated units or portions of RCRA-regulated units located within the Building 371/374 facility footprint will be closed before facility demolition. Units located outside the facility footprint (e.g., process waste tanks T-231A and T-231B [Units 43.01 and 43.02), the valve vaults, and process waste lines associated with the Building 374 Aqueous Waste Treatment System [Unit 374.3] have been transferred to RISS for closure.

RISS Project personnel will close Tanks T-231A and T-231B, the process waste lines, and the valve vaults in accordance with the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities* and the *RSOP for Environmental Remediation*.[24] Final closure of these units will be conducted outside the scope of this DOP, upon proper notification of the LRA.[25]

To facilitate final disposition, pertinent characterization information has been transferred to RISS and recorded in the CERCLA Administrative Record (AR) File (see Section 11.1 of this DOP). This information includes descriptions of the locations of any remaining piping and applicable characterization information (e.g., process knowledge and sampling results).

6.3 Closure Documentation

For RCRA units undergoing clean closure by decontamination, a closure certification will be prepared and signed by an independent, Colorado-registered, professional engineer. The closure certification will be submitted to the LRA for review and concurrence within 60 days after completion of the associated closure activities. Units closed by historical knowledge confirmation or removal will not require a professional engineer's certification.

RCRA unit closure activities will be documented in the Building 371/374 Closure Project AR File and referenced in the PDSR, which will be completed before building demolition. Upon final closure of each RCRA-regulated unit, the Site's Master List of RCRA Units will be updated to reflect the new closure status and the unit will be removed from the RCRA Part A and Part B Permits in accordance with the applicable hazardous waste regulations.[26]

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[24] The *RSOP for Environmental Remediation* is currently in draft form. It will not be invoked until it has been approved by the LRA.

[25] Notification requirements are discussed in Section 8.3 of the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*.

[26] Code of Colorado Regulations, 6 CCR 1007-3, Section 100.63, Permit Modification at the Request of the Permittee.

7.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Decommissioning activities conducted at RFETS must comply with the ARARs under CERCLA. ARARs have been identified for the complete scope of decommissioning activities, including demolition, and they are contained in the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities* and the *RSOP for Facility Disposition*.[27]

[27] Certain State of Colorado Radiation Control Regulations pertaining to decommissioning and environmental releases may be relevant and appropriate to building decommissioning and environmental restoration activities, particularly the cleanup of soils. The parties to RFCA are in the process of negotiating a final list.

8.0 ENVIRONMENTAL CONSEQUENCES

RFCA mandates incorporation of National Environmental Policy Act (NEPA) values into decision documents (DOE 1996). Accordingly, this section addresses the potential environmental consequences of the activities needed to complete facility disposition (as specified in Section 4.0). This section only addresses the environmental consequences for Alternative 2 of the demolition process alternatives analysis (Section 1.1.1.2). The environmental consequences associated with the activities to prepare the facility for demolition are contained in the *RSOP for Component Removal, Size Reduction, and Decontamination Activities*. The environmental consequences associated with Alternative 1 of the demolition process alternatives analysis (Section 1.1.1) are contained in the *RSOP for Facility Disposition*.

As a principle topic of concern, and as outlined in the RFCA, waste management is discussed separately in Section 5. Unavoidable impacts, cumulative impacts, and long term impacts are also considered in this section. As appropriate, guidelines or requirements that minimize or mitigate the impacts of proposed activities are provided in each section, as appropriate.

This section analyzes impacts from disposition activities, and discusses how the impacts of disposition activities may be cumulative with impacts from other actions (e.g., truck traffic associated with building disposition is combined with traffic from nearby gravel pit operations to evaluate the impact on nearby roads).

Some of the analyses in this section are based on bounding analyses taken from the *Cumulative Impacts Document* (CID) (DOE, 1997). The analyses presented in the CID consider impacts from the full scope of activities that are required to close the Site. These activities include, for example, loading, packaging, storing, and transporting waste in all areas of the Site. The CID analysis includes the total impacts of Site closure. The impacts from building disposition are bounded by the total impacts of the closure, as documented in the CID.

The environmental analysis indicates that impacts to environmental resources and human health and safety will be minimal, given implementation of mitigation measures. Results of the impact estimates are summarized below, and discussed in detail in the following subsections. Surface and subsurface soils will be disturbed throughout the developed portion of the Site, but activities will occur in previously disturbed and contaminated areas. Building disposition is a prerequisite to environmental restoration and the cleanup of contaminated soils at building sites. Air quality impacts will be related to particulate emissions, but emissions will be controlled by mitigation measures and will be short-term in duration. Erosion control measures and protection of contaminated concrete will mitigate adverse impacts to water quality. Risks to human health and safety will be greatest for workers; the risks will be reduced by this action.

Public health and safety risks will be a small fraction of worker risk. Ecological resource impacts will vary, with some species increasing and other species declining as a result of the action. Historic resources have been documented and recorded, and no impact will occur to historic resources. The appearance of the Site will change dramatically as buildings are removed; an open space appearance will result. Noise effects will be temporary and insignificant. The impacts of shipping will be temporary and minor.

8.1 Soils and Geology

Soils throughout the Site would be disturbed during demolition activities. Equipment will operate in and around the structure, using paved areas and roads as feasible, but may also traverse or operate from unpaved areas. Most debris will be contained within or near the footprint of the facility, but some debris may be placed in stockpiles on nearby open areas.

Most soils in the developed portion of the Site are identified as Flatirons very cobbly to very stony sandy loams, which have a low permeability, slow runoff potential, and a slight wind and water erosion potential. Less common soils in the developed area include Nederland and Denver-Kutch-Midway. Nederland is a very cobbly, sandy loam, with moderate permeability, rapid runoff and severe water erosion potential (10-15% slopes), and slight wind erosion potential. Denver-Kutch-Midway is a clay loam with a low permeability, rapid runoff and severe water erosion potential (5-25% slopes), and low to moderate wind erosion potential (DOE 1997). Most soils in the project area have been heavily modified or covered with paved surfaces, and do not retain their original soil properties.

Since facility demolition activities will be conducted throughout developed portions of the Site, including areas with potential surface contamination, activities must be managed to avoid disturbing contaminated soils, or managed to contain and prevent further distribution of contaminated soils. Demolition will include the removal of building foundations to three feet below grade. The demolition activities will not include remediation of contaminated soils.

Uncontaminated soils will not be altered significantly during and following the demolition activities. While soil erosion will not be prevalent, given the generally low erosion potentials and large paved areas, substantial amounts of small debris, dust, and fines may be generated during disposition activities. These materials may remain after the larger pieces of debris have been removed, but the area will be cleaned to prevent wind or water from spreading the dust and to allow for eventual suitable site restoration. Various control measures, such as silt fences, may also be implemented to control runoff from facility locations. These controls will also be used where disturbed soils are prone to water erosion. A listing of potential control measures is provided in the *RSOP for Facility Disposition*.

Although fuels, oils, and other solid or liquid materials used during demolition could be spilled, soils are not highly permeable, paved areas are largely impervious, and a spill control plan would be implemented by the Site. Surface and subsurface soils will not likely be substantially affected by a spill.

The anticipated grade of 8 to 1 horizontal to vertical slope for the bulk of the land surface over the Building 371/374 footprint is very stable as shown by the behavior of existing slopes within and around Rocky Flats. The accompanying slopes of 4 to 1 horizontal to vertical are very common slopes in the construction of highways and surface water management structures. Much construction is done at steeper slopes (3 to 1 horizontal to vertical or 2 to 1 horizontal to vertical) without long term erosion with a well-established stand of vegetation. Vegetation is very important to the control of erosion and vegetation will be planted on all soil surfaces at Building 371/374.

Vegetation will be planted on the fill at Building 371/374 after demolition, as with any surface fill or disturbed surface on the IA. The vegetation will take some time (several years) to fully establish. During that time, routine inspections and repair of erosion areas will be required. This is common to construction at any location across the USA. The details of the monitoring system are being developed as part of the IMP. These planned inspections, repair and monitoring systems would be conducted even if the building slab and walls were removed.

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8.2 Air Quality

This analysis is primarily concerned with particulate emissions, since these pollutants are most likely to be generated by demolition activities. The Site conducts continuous and extensive monitoring for radionuclide air pollutants. Air emissions from Rocky Flats are within limits for all pollutants for which there are standards (DOE 1998b). Activities conducted during facility demolition will also be monitored on a continual basis, and air pollutant levels are expected to remain within established limits.

Environmental air monitoring will be performed in accordance with the requirements of the Site Integrated Monitoring Plan (IMP). The existing RAAMP sampler network will be used for ambient air monitoring during removal activities. The RAAMP sampler network continuously monitors airborne radioactive materials dispersed from Site sources into the surrounding environment. Thirty-six samplers comprise the RAAMP network. Fourteen of these samplers are deployed at the Site perimeter and are used to confirm Site compliance with the 10 mrem dose standard mandated in 40 CFR Part 61, Subpart H; these samplers will be used to confirm that demolition has contributed less than 0.1 mrem of dose potential to public receptors. Filters from the 14 perimeter RAAMP samplers are collected and analyzed monthly for uranium, plutonium, and americium isotopes. Results of compliance sampling at the Site perimeter are compiled, communicated to project management as soon as practical following laboratory analysis, and presented in the Quarterly Environmental Monitoring Reports and the Radionuclide Air Emissions Annual Report.

In addition to the perimeter network, project monitoring (PM-Rad) will be carried out during demolition and removal activities using existing RAAMP samplers arrayed around the Site's Industrial Area or with some similar network of samplers, should the infrastructure to support these RAAMP samplers be removed to support the Site closure mission. It is unlikely, given that the path to closure must include removal of electrical utilities and remediation of contaminated soils (e.g., 903 Lip Area utility removals), that all 10 existing RAAMP sampler locations currently used to monitor demolition and remediation activities in the IA will remain in service through the end of 371 demolition. Therefore, as infrastructure is lost and RAAMP sampling is no longer supported within the IA, the IMP will be revised accordingly and the project monitoring design for 371 air emissions will be updated.

As currently used, PM-Rad characterizes potential short-term emissions from the project on ambient air quality and receptors closer to the projects than the Site perimeter by quantifying gross alpha activity on filters. Gross alpha analysis can be performed in a much shorter time frame (days versus weeks) than is necessary for isotopic analysis. The following sampling plan (or one revised as necessary to accommodate different sampler operating conditions) would be observed:

Beginning at least one week before the start of demolition, PM Rad sampling will begin on a weekly filter exchange schedule. In accordance with the IMP, filters will be collected weekly and screened for long-lived alpha contamination and/or gamma emissions. Results of the radiation screening will be available about four workdays after submitting filters to the laboratory. The results will be used to calculate the airborne concentration in units of activity per volume of air drawn through the filter (pCi/m). These results will then be compared to two predefined Action Levels, based on the expected isotopic composition of materials to be disturbed. Action Level 1 will correspond to a 1.0 mrem dose rate, and Action Level 2 will correspond to a 5.0 mrem dose rate at the sampling location, based on the assumption that the hypothetical receptor has been exposed for two weeks (one week of sample collection, one week for analysis). All alpha activity is assumed to derive from Pu-239 for the purpose of determining whether Action Levels have been exceeded, until isotopic results prove otherwise; this approach provides conservatism.

For radionuclide concentrations below Action Level 1, PM-Rad will continue with weekly filters being screened for radioactivity. If Action Level 1 is exceeded, affected weekly filters from the area-specific samplers will be submitted for isotopic analysis on an expedited schedule. Site environmental personnel

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will meet with project personnel to evaluate the project for unexpected conditions and to determine what additional sample collection and analysis may be warranted. Site environmental personnel will contact project personnel within six hours of receiving results if Action Level 2 is exceeded, and will meet with project personnel to reassess project parameters and evaluate measures to mitigate future emissions. Mitigating measures may include additional dust control efforts, modifications to demolition techniques, reevaluation of work response to environmental conditions (e.g., high wind), and cessation of work.

When sample isotopic results exceeding Action Level 2 also indicate that a 10 mrem dose to the most impacted public receptor could occur (based on the indicated concentration remaining constant for one year), project operations will cease until appropriate controls are in place. Results of performance monitoring will be communicated to project management as soon as practicable following laboratory analysis, and will be summarized in the Quarterly Environmental Monitoring Reports.

If RAAMP sampling for PM-Rad is not possible due to reductions in infrastructure, temporary air sampling resources will be deployed in a manner agreeable to project managers, air quality management program professionals, and regulatory authorities and stakeholders. Such resources could include the medium-volume samplers currently used in the Site's project monitoring for beryllium program, which use significantly less power than the RAAMP samplers. The use of non-RAAMP sampling resources will result in a loss of sensitivity, since RAAMP samplers draw a very high volume sample (40 cubic feet per minute [cfm]), whereas a beryllium sampler draws much less (~6 cfm). Any change in sampling resources will require a re-calculation of sampling sensitivity and, potentially, a revision to PM-Rad Action Levels to reflect the limitations of non-RAAMP sampling apparatus. This process will be addressed through the consultation and documentation in the IMP.

Areas with contamination that remain during demolition will need to be protected. The protection material will be placed over the area to prevent damage to the fixatives that prevent contaminants from being dispersed as windborne particles, see Section 4.5 for additional information. These and other measures will be used as needed to prevent the release of contaminants.

Demolition activities will include operation of heavy equipment, vehicles, generator sets, and similar equipment. Several pieces of equipment may be used at the facility, with operational hours limited according to the size and type of facility. The emissions from equipment will not generate sufficient criteria emissions to affect NAAQS. Temporary fossil fuel-fired equipment use (or fuel use) will need to be tracked to ensure that emissions remain within regulated amounts, or that appropriate notices or permit modifications are filed. In addition, opacity rules will need to be followed (limiting opacity below a 20 percent standard). Demolition activities will generate dust, including both TSP and PM-10, that may be of concern, and each facility will have a control plan that provides for dust control (e.g., covering facilities and stockpiles, spraying water).

Hazardous air pollutants include a wide range of materials or chemicals (e.g. solvents) that are toxic or potentially harmful to human health. Sources of HAPs, including asbestos, are to be removed before demolition activities. A demolition notification must be filed with CDPHE certifying that the facility has been examined for asbestos. The certification also provides verification that refrigerants or ozone depleting compounds have been removed. Details on meteorology, air quality, monitoring, and air emission controls at the Site can be found in the CID.

8.3 Water Quality

Water quality at the Site could be affected by demolition activities. Water quality, during demolition, subsequent stockpiling of facility debris, and due to the final condition of each facility site, could be adversely affected by runoff or seepage to groundwater following rain or snow events.

A work package will be prepared before demolition; the package will address potential pollutant sources and the way in which the pollutant could reach surface waters, downstream basins, or ponds. Berms, silt fences, or similar erosion control devices may be used to prevent debris (e.g., silt or contaminated soils) from being washed into surface water drainages. Drains and other subsurface openings will be sealed or plugged before demolition, and debris will be loaded into covered roll-off containers, drums, or similar containers to prevent the loss of dust and debris. Street sweepers may be used on roads to collect debris and dust spilled during the on-site transportation of the facility debris.

Areas with contamination that remain during demolition will need to be protected. The protection may include measures such as covering the areas with gravel and/or soil to prevent damage to the fixatives that prevent contaminants from being dispersed as windborne particles. Such measures will be used as necessary to prevent groundwater and surface water impacts.

Demolition will also be restricted according to weather conditions as determined by safety and environmental concerns. Surface water that is channeled from around facilities is sampled at surface water sampling locations down-gradient from the facilities.

After each facility has been demolished and facility debris and other wastes removed, the sites will again be inspected by the project team. The final inspection will ensure that debris, materials, and dust at the site have been removed, and that the potential for future erosion is minimized. Because these measures will prevent or mitigate the release of pollutants to surface waters, impacts to surface waters are likely to be minimal.

The B371 groundwater modeling was conducted to assess the affect on groundwater when leaving the structure in place; in addition to assessing potential groundwater contamination in the area. The groundwater modeling to support decommissioning indicates that building does not have any adverse impacts on groundwater and recommends that openings not be made in the South side of the building and the foundations drains be disrupted.

In addition, some groundwater will flow through the fill due to the infiltration of direct rainfall on the surface of the fill. This groundwater will flow vertically and then horizontally (to the North) within the footprint of the building. To reduce the possibility of a surface seep from this groundwater, a permeable layer (like gravel or crushed concrete) will be placed over the top of the concrete slab that remains in place. This will control the groundwater level within the footprint of the building to reduce the possibility of a surface seep. The details of the drainage layer and where the flow from this layer will be directed is still under evaluation.

The mobility of the fixed contamination that could be dislodged during the demolition process is negligible. Dislodged contamination would become trapped in the interstitial spaces of the soil and not move more than several inches through the soil. Soluble contamination is also not expected since the groundwater would need to be in a reduced state with low pH to leach the plutonium or americium from the fixed contamination.

8.4 Human Health and Safety

Physical hazards to workers involved in facility demolition are similar to the hazards found in comparable commercial demolition activities. The CID reports a projection of 584 worker injury and illness cases in the year of highest closure activity at the Site; cases specifically associated with facility demolition activities would be a fraction of the Site total.

A project-specific Health and Safety Plan (HASP) and Job Hazard Analysis will be prepared on a facility or project-specific basis to identify and control potential hazards. The HASPs will address both the specific hazards to be encountered and applicable guidance and requirements (e.g., OSHA), as well as specific safety equipment (e.g., hard hats, PPE) required for individual tasks. The HASPs will also recognize the special risks and safety requirements associated with heavy equipment used in demolition and will provide procedures for site workers near such machinery. Implementation of the requirements of these documents will minimize the possibility and potential consequences of accidents, and minimize physical hazards.

Potential threats to health and safety for collocated workers and the general public from the release of airborne materials will be mitigated via implementation of dust suppression techniques. The use of controls and procedures for worker protection will also protect the public, since work control measures are designed to identify potential hazards and prevent (e.g., by using dust controls) releases.

The CID reports the following estimated annual radiological doses from Site closure activities: maximally exposed collocated worker 5.4 mrem; maximally exposed member of the public 0.23 mrem; population dose 23 person-rem. The population dose would be expected to produce 0.012 latent cancer fatalities in the region of interest population of 2.7 million. Since these estimates include all Site closure activities, impacts from activities addressed in this document will be a small fraction of those reported above.

8.5 Ecological Resources

Facility disposition will permanently affect local ecosystems. In particular, various bird species (e.g., swallows, finches, etc...) use the facilities for nesting sites; these nesting sites will be permanently lost. Bird densities for certain species, especially barn swallows and cliff swallows, are expected to decline in the industrial area. Mammals such as deer, rabbits, and mice also use the industrial area at times.

Although habitat for these mammals will be temporarily impacted by the demolition of the facilities, the long-term effects will be positive once native vegetation is restored in the industrial area. The industrial area and supporting facilities do not currently support or provide habitat for threatened or endangered plant or animal species, or species of concern, nor do they contain unique or unusual biological resources.

Wetlands exist in some portions of the industrial area, and demolition activities that could impact wetlands must be reviewed before initiating the action. Down-gradient wildlife habitat could also be damaged if soils or other eroded materials are allowed to flow into the habitats. Silt fencing or other mitigative measures to prevent siltation will be used. To minimize the possibility of adverse effects, and ensure that regulatory compliance is met, surveys of the potentially disturbed sites by Site ecologists will be conducted before any demolition activities.

The Industrial Area will change from a densely built environment to an open environment with no structures, accompanied by a dramatic decrease in human activities. Animal species will repopulate the area, with some species increasing, and other species declining (e.g., due to a loss of suitable nest sites).

Disturbed open areas will be revegetated. Weed species may invade many open areas unless adequate weed control and reseeding of disturbed areas is provided. The project impacts to ecological resources are anticipated to be negligible.

8.6 Historic Resources

During the Cold War Era, RFETS was one of only 13 nuclear weapons production sites in the United States. In 1995, DOE conducted a survey of cultural resources in the Industrial Area and evaluated the Cold War Era resources using guidelines set forth by the Department of Interior (DOE 1995). Based on this survey, 64 facilities at the Site were determined highly important to regional, national, and international history for their role in the Cold War Era. These 64 facilities were either primary contributors to the production of weapons or secondary contributors to the central mission of the Site, and functioned together to produce nuclear weapons during the Cold War.

The State Historic Preservation Officer determined these facilities eligible for the National Register of Historic Places as an historic district. The Rocky Flats Plant Historic District (site 5JF1227) was placed on the National Register of Historic Places on May 19, 1997. Documentation and preservation requirements are set forth in a Programmatic Agreement signed by the DOE Rocky Flats Field Office, the Colorado State Historic Preservation Officer, and the Advisory Council on Historic Preservation.

Facilities to be demolished include those facilities within the Rocky Flats Plant Historic District. Before any alterations, documentation of the historical significance of the buildings is required to comply with the Programmatic Agreement signed by the DOE Rocky Flats Field Office, the Colorado State Historic Preservation Officer, and the Advisory Council on Historic Preservation. The history of the Rocky Flats Plant, including all 64 buildings within the Historic District, has recently been documented in the *Historic American Engineering Record for the Rocky Flats Plant Historic District* (HAER-CO-83-T) (Kaiser-Hill 1999). Such documentation, consisting of a narrative report, engineering drawings and photographs, meets the requirements of the Programmatic Agreement and has been accepted by all responsible parties. Since this documentation includes facilities that will be demolished, it effectively mitigates any adverse impacts to cultural resources associated with demolition.

Minimal groundwork is anticipated (e.g., installation of silt fences), and most work would occur on previously disturbed land. Therefore, no impact to historic artifacts will occur. Should any historic resource be identified during the project, work will be stopped and Site procedures regarding historic resources will be followed.

8.7 Visual Resources

Project activities will completely change the landscape at the Site. The removal of the facilities will permanently change the visual setting from an industrial setting to an open space setting. The appearance of the Site will be close to the original prairie setting, although some roads and paved areas may be left throughout the Site. The change will be visible from public roads and areas around the Site during daylight hours. At night, the existing man-made lighting will be gone; the setting will be congruent with undeveloped open space.

During the demolition activities, equipment may be visible from off-Site locations. Dust generated during demolition may be temporarily visible, but would dissipate before leaving the Site as a visible cloud or plume of dust. Control measures, such as watering, will be used if needed to control dust.

8.8 Noise

Demolition activities will result in a temporary increase in local noise levels. The increased noise will result from the demolition of the facilities, and the loading and hauling of the resultant debris. The noise will generally be consistent with prior site construction and demolition activities (such as other heavy equipment operations). Most noise from the demolition will not include sudden, short, or unexpected noises.

Demolition operations will be conducted during the day, and noise will be attenuated by distance and obstructions. For example, a front-end loader generates about 84 decibels (dB) at 50 feet (the threshold of hearing loss for prolonged exposure). At 1,600 feet, that noise will drop to about 54 dB (below the accepted level for residential land use). Vegetation, facilities, and terrain will further attenuate the noise. Since the nearest public receptor is over 5,000 feet from either project site, noise generated by the project will be effectively confined to the Site. Although public receptors will not be effected by most types of demolition noise. Appropriate hearing protection will be supplied for workers, as specified in the project HASP.

8.9 Transportation

Disposition activities will produce wastes requiring disposal at off-site facilities, and transport to those facilities. One of the most abundant materials resulting from facility disposition will be concrete. Clean concrete may be reused on the project as backfill; minimal off-Site transportation or impact is projected (*Concrete Disposition RSOP*, 1999). Sanitary waste (e.g., scrap steel, wood, insulation, other construction debris) will be separated and shipped off-Site; these wastes are currently projected to be about 38 percent of the waste volume to be shipped off-Site during closure (LaHoud, 2000).

The low volume of daily truck traffic is not expected to affect road traffic or safety, and transportation activities will not disproportionately affect minority and low-income populations. However, the volume-to-capacity traffic ratios of Highway 93 and Indiana Avenue during peak traffic hours (both morning and afternoon) are rated as poor (Jefferson County, 2000). Scheduling truck traffic during off-peak hours (mid-morning to mid-afternoon) can reduce traffic impacts. The project transportation impacts are anticipated to be negligible.

8.10 Unavoidable and Cumulative Effects

Some temporary, adverse effects will necessarily occur because of the project activities. Some small areas of surface soils will be compacted or otherwise modified. Minor quantities of air pollutants will be released to the atmosphere. Workers will experience health and safety risks that are typical of demolition projects. Noise levels will increase slightly. The facilities are a resource that will be permanently lost for other uses, and fuels and other resources will be consumed during the demolition.

The proposed action is a key element of the overall mission to clean up the Site and make it safe for future uses. The cumulative effects of this broader, Site-wide effort are described in the CID. That document describes the short- and long-term effects from the overall Site clean-up mission. Actions taken during facility disposition will be part of the overall process for closure of the Site, but disposition activities will usually result in discrete, short-term effects that will not be cumulative with effects resulting from other closure activities.

Cumulative effects of the facility demolition activities with other Site projects and projects near the Site will not be notable. Temporary cumulative effects will include air emissions (e.g., fugitive dust; exhaust emissions) and noise (e.g., vehicle noise). The increase in air emissions and noise will minimally add to pollutants and noise from off-Site activities.

8.11 Short-term Uses versus Long-term Productivity

The project area consists of Building 371/374 and nearby supporting structures. The project area will not affect grassland because all of the project area is previously disturbed and industrialized. Overall, project activities will improve the area and will create the potential for other, possibly more productive uses after the Site closes. Following demolition, the area will have the appearance of open space.

8.12 Irreversible and Irretrievable Commitments of Resources

This project will irretrievably consume fuels, small quantities of other materials, water, money, and labor. Resources originally used during the construction of the facilities will be irretrievably lost. If the facilities were preserved or re-used, the consumption of these resources would be considerably increased.

9.0 IMPLEMENTATION SCHEDULE

The recent Site-wide re-baselining effort has resulted in the development of a detailed schedule and basis of estimate for completion of the Building 371/374 Closure Project. A copy of this schedule is provided in Appendix D. The schedule is not an enforceable part of this DOP and DOE or its contractor may alter the schedule without prior notification to or approval by the LRA. Significant schedule changes will be shared with the LRA as part of the RFCA consultative process.

10.0 NOTIFICATION REQUIREMENTS

This DOP satisfies the notification requirements for the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities* and the *RSOP for Facility Disposition.*

11.0 RECORDS DISPOSITION

Building 371/374 Closure Project records consist of the CERCLA AR File, the RCRA Operating Record, the Closure Project Files, and the Decommissioning Final Closeout Report and associated documentation.

11.1 CERCLA Administrative Record File

This section identifies the documents that constitute the AR File for the Building 371/374 Closure Project. Upon completion of the public comment period, comments received from stakeholders will be incorporated into this DOP. LRA approval of this DOP constitutes approval of the AR File. The following documents comprise the Building 371/374 Closure Project AR File:

- Final Rocky Flats Cleanup Agreement (RFCA)
- RFETS Decommissioning Program Plan (DPP)
- RFETS Facility Disposition Program Manual (FDPM)
- RFETS Decontamination & Decommissioning Characterization Protocol (DDCP)
- RFETS Reconnaissance Level Characterization Plan (RLCP)
- Building 371/374 Closure Project Joint Scoping Meeting Minutes/Disposition
- Building 371/374 Closure Project Reconnaissance Level Characterization Report (RLCR) and related correspondence
- Draft Building 371/374 Closure Project DOP
- Final Building 371/374 Closure Project DOP and related correspondence
- Concurrence letter for the Building 371/374 RLCR
- Approval letter for the final B371/374 DOP
- All other documents referenced in this DOP
- DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.
- DOE, 2002, Final Industrial Area Sampling and Analysis Plan, FY03 Addendum IA-03-01, IHSS Groups 300-3, 300-4, 400-8, 700-4, 800-1, and 900-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.
- DOE 2003, Data Summary Report, IHSS Groups 300-3 and 300-4, UBC 371 and UBC 374, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

The following information repositories have been established to provide public access to the Building 371/374 Closure Project AR File:

U.S. Environmental Protection Agency (EPA)
Region VIII
Superfund Records Center
999 18th Street, Suite 500
Denver, Colorado 80202-2466
(303) 293-1807

U.S. Department of Energy Rocky Flats Public Reading Room
Front Range Community College Library
3645 West 112th Avenue, Level B
Westminster, Colorado 80030
(303) 469 4435

Colorado Department of Public Health and Environment (CDPHE)
Information Center, Building A
4300 Cherry Creek Drive South
Denver, Colorado 80220-1530
(303) 692-3312

11.2 RCRA Operating Record

RCRA records, including inspection records, will be maintained with the existing Building 371/374 RCRA Operating Record. Upon completion of the Building 371/374 Closure Project, the RCRA Operating Record will be transferred to Site Records Management for storage.

11.3 Closure Project Files

Project-specific documents will be stored in the Building 371/374 Closure Project files until final closure is complete, at which time the Closure Project Files will be processed through Site Records Management and archived. The Closure Project Files will contain characterization documentation, inventory sheets, project correspondence, comment resolution, IWCP work packages, and additional information that is a direct result of the work involved in the project. Maintenance of the Closure Project Files is a Site requirement.

11.4 Decommissioning Final Closeout Report

Upon completion of decommissioning activities for the Building 371/374 Closure Project, a Decommissioning Final Closeout Report will be prepared in accordance with RFCA[28] and the DPP.[29] The Closeout Report will consist of a brief description of the work completed, including:

- Any modifications to the original DOP;
- Final sampling and analysis reports;
- A description of the quantity and characteristics of the wastes generated and how the wastes were stored or disposed; and
- A statement, if true, that the goals and objectives of the Project were met and if not, what additional work is required.

[28] RFCA Implementation Guidance Document (Appendix 3 to *RFCA*), (latest revision).

[29] DPP Section 3.3.11, Notifying Regulators of Completion of Decommissioning (latest revision).

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The expected outline for the Closeout Report is shown below. The format may change to meet the needs of the Project.

- Introduction
- Remedial action description
- Verification that remedial action goals were met
- Verification of treatment process (if applicable)
- Radiological analysis (if applicable)
- Waste stream disposition
- The global positioning system location of the Building 371/374 structure remaining underground and a reference to the final characterization report, which details the nature and extent of the contamination remaining on the structure
- Site reclamation
- Deviations from the decision document
- Demarcation of where excavation took place
- Dates and durations of specific activities (approximate)
- Final disposition of wastes (actual or anticipated)

Upon completion, the Decommissioning Final Closeout Report will be submitted for review and approval by the LRA.

12.0 COMMENT RESPONSIVENESS SUMMARY

The responsiveness summary addressing stakeholder comments on the final draft version of this DOP will be attached as Appendix E.

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GLOSSARY OF TERMS

Following are terms that are unique to this RFCA decision document. For the definitions of other terms used in this and other RFCA decision documents, refer to the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*, the *RSOP for Facility Disposition*, and the *RSOP for Recycling Concrete*.

Decommissioning Area. Small, manageable grouping of similar systems, equipment, and areas or rooms that may be worked independently. Dismantlement Areas contain less than 2,000 dpm removable contamination and are generally decommissioned by Building Trades.

Dismantlement Set. Small, manageable grouping of similar systems, equipment, and areas or rooms that may be worked independently. Dismantlement Sets contain greater than 2,000 dpm removable contamination and are generally decommissioned by Steelworkers.

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